



***A CLOSURE PLAN
for a Section of the
PROCESS SEWER LINE***

HANGING ROCK PLANT

***Prepared for:
The Dow Chemical Company
Hanging Rock, Ohio***

Radian Project No. 800080.30

RADIAN
INTERNATIONAL LLC

October 1996

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FOR A SECTION OF THE
PROCESS SEWER LINE**

**HANGING ROCK PLANT
IRONTON, OHIO**

Prepared for:
The Dow Chemical Company
Ironton, Ohio

Prepared by:
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Radian Project No. 800080.30

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1.0 Introduction

This Plan outlines key elements of the closure activities for a 150-foot section of the Process Sewer Line and underlying the Former Drum Storage Area extending to the north of this area to Manhole No. 3 at The Dow Chemical Company (Dow), Hanging Rock Plant. The Process Sewer Line was installed in 1968 for the purpose of collecting process water from several plant operations and transferring the water to the on-site wastewater plant. Since 1980, the Process Sewer Line was used also to transfer rain water from several of the plant's areas. The use of the section of the Process Sewer Line from Manhole No. 3 south to the wastewater treatment plant ceased in late 1993. Background information including description of plant operations and activities leading up to the Closure Plan are discussed, including constituents concentrations in soil, sources and extent of constituents in soil. Constituents of concern are acrylonitrile (AN), ethylbenzene (EB), methylene chloride (MC), and styrene (ST).

Past Process Sewer Line investigations revealed that AC, EB, and ST are associated with a subsurface source, i.e., a section of the Process Sewer Line underlaying the Former Drum Storage Area and extending to the north of this area. The fourth chemical, MC, displayed concentrations near the ground surface indicating a surface source, i.e., the Former Drum Storage Area.

This proposed Closure Plan addresses constituents concentrations in soil associated with these two sources, although the Former Drum Storage Area is recognized by the Ohio Environmental Protection Agency (OEPA) as a separate solid waste management unit. This is done to avoid any future need for additional cleanup along the 150-foot section of the Process Sewer Line which underlays the Former Drum Storage Area and extends to the north to Manhole No. 3. Closure of the Process Sewer Line is discussed in a separate document.

In addition, this proposed closure will be done as recommended by the Ohio EPA to mitigate the process sewer line release from segments underlying the Former Drum Storage Area and to the north of this area.

The proposed activities will meet the State of Ohio and the U.S. EPA Resource Conservation and Recovery Act (RCRA) closure intent. Risk-based soil cleanup levels will be utilized and approximately 260 cubic yards of excavated soil will be disposed of in accordance with applicable regulations.

This Closure Plan outlines the key program elements and specifications.

2.0 Site Background

This section provides a summary of plant location and history of the section of the Process Sewer Line to be closed, including a short description of plant operations, and activities leading to this Closure Plan.

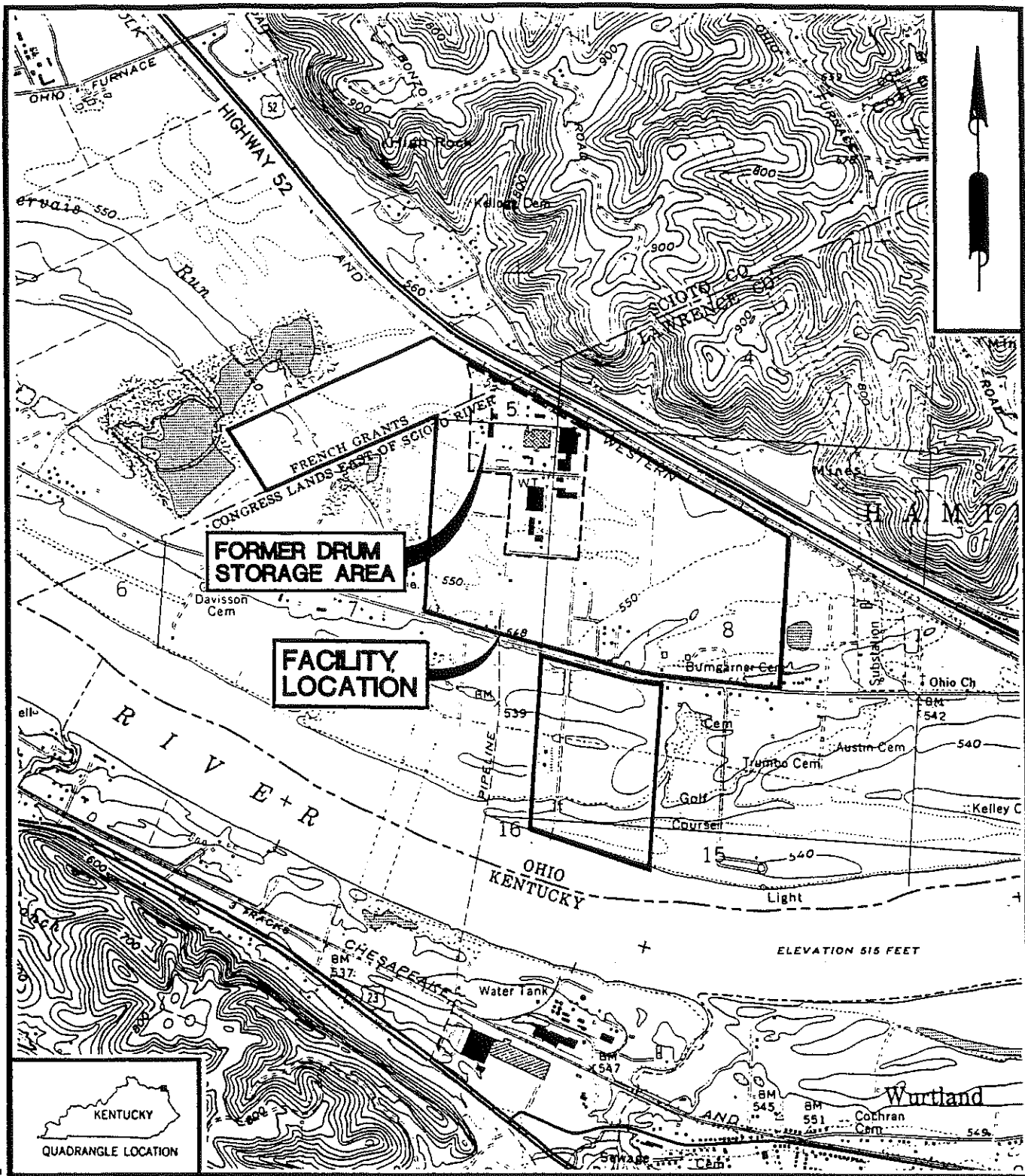
2.1 Plant Location

The Dow Hanging Rock Plant is located in Southeastern Ohio, approximately four miles northwest of Ironton (Figure 1). Shown in Figure 1 are the Dow property line and plant area, which occupies only a small portion of property. The plant is located on a 750-acre property in Hamilton Township in southeast Lawrence County. The land use in the vicinity of the facility is predominantly agricultural. The property owned by Dow is bounded to the north by wooded hills beyond State Highway 52, to the south by the Ohio River, to the east by farmland, and to the west by the Lawrence-Scioto County line. The plant itself is immediately surrounded by leased farmland owned by Dow, where corn and hay are the predominant crops. Big Thief Creek flows east to west through the southern portion of Dow's property, joining the Ohio River approximately 1,000 feet outside the property line.

The plant address is:	The Dow Chemical Company
	Hanging Rock Plant
	Gilruth Lane
	Ironton, Ohio 45038

2.2 Description of Plant Operations

The Dow Hanging Rock Plant was constructed in 1957. The plant currently manufactures and ships polymeric beads and foams. Three plants are presently operating at the Hanging Rock Site: the Styron plant, the Styrofoam plant, and the Ethafoam plant. The Styron plant began operations in 1968. The plant produces bulk quantities of high impact polystyrene using the trade name of Styron™, acrylonitrile butadiene styrene (ABS) co-polymer using the trade name Magnum™, and general purpose polystyrene (GP). The products consist of 1/8-inch to 1/4-inch beads, and are typically shipped by railcar.



0 2000 4000
SCALE IN FEET

REFERENCE:

BASE MAP IS A PORTION OF THE U.S.G.S. 7.5 MINUTE TOPOGRAPHIC SERIES GREENUP, KY-OHIO QUADRANGLE. DATED: 1972, PHOTOREVISED: 1985. SCALE: 1" = 2000', CONTOUR INTERVAL IS 20 FEET.

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**PLANT LOCATION, PROPERTY LINE
AND PLANT AREA**

HANGING ROCK PLANT

IRONTON, OHIO

CLIENT: DOW CHEMICAL COMPANY

JOB NUMBER: 7015

SCALE: AS SHOWN

FIGURE
NUMBER

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The Styrofoam plant began operations in 1957. This plant produces polystyrene foam using the trade name Styrofoam™ which has excellent insulating properties and is primarily used by the construction industry. The products range in thickness from 1/8-inch to 3-inches, and have various lengths and widths.

The Ethafoam plant produces polyethylene foam using the trade name Ethafoam™. Ethafoam is a dynamic cushioning material with some elastic properties. It requires further processing from fabricators, one typical use being to protect computers or other shock-sensitive products during shipping. A final Ethafoam product is Seal Sil. It consists of 50-foot, 6-inch-wide rolls of foam, which are used to seal house foundations.

The raw materials used in the production of the plant products include liquid styrene, ethylbenzene, acrylonitrile, polyethylene, various catalysts and blowing agents, and butadiene rubber. The three main operations have the necessary support facilities including process boilers, cooling towers, materials storage and handling, collection sumps, a wastewater treatment system, and miscellaneous auxiliary operations.

In November 1980, Dow submitted a RCRA Part A permit application to the U.S. Environmental Protection Agency (U.S. EPA) Region V for a container storage area with a capacity of 15,000 gallons (72 drums). A Part A interim status authorizing on-site storage of hazardous wastes (D001, F002, and U009) in containers was issued by U.S. EPA in May 1982.

In November 1981, the Ohio Hazardous Waste Facility Approval Board granted Dow an Ohio Hazardous Waste Facility Installation and Operation Permit based on the information in the Part A application.

In December 1985, Dow submitted a RCRA Part B permit application. Revisions to the Part A and B permit applications were made several times since their submittals. Currently the Hanging Rock Plant operates under RCRA interim status.

The U.S. EPA performed a preliminary review/site inspection and issued a report in March 1989⁽¹⁾ summarizing results of the review and inspection. The report identifies 43 potential solid waste management units (SWMUs).

2.3 History of the Area to be Closed

One of the SWMUs identified by the U.S. EPA is the Process Sewer System which consists of pipes and collection sumps. It is SWMU No. 30 in the 1989 U.S. EPA report⁽¹⁾. This plan addresses a section of the sewer line which runs under the Former Drum Storage Area to the north up to Manhole No. 3 (Figure 2). This section was used between 1968 and late 1993 to transfer process water from the Styron and Magnum plants to the on-site wastewater treatment plant. Use of the sewer line section south of Manhole No. 3 to the wastewater treatment plant ceased in late 1993 and was replaced with a temporary above ground line.

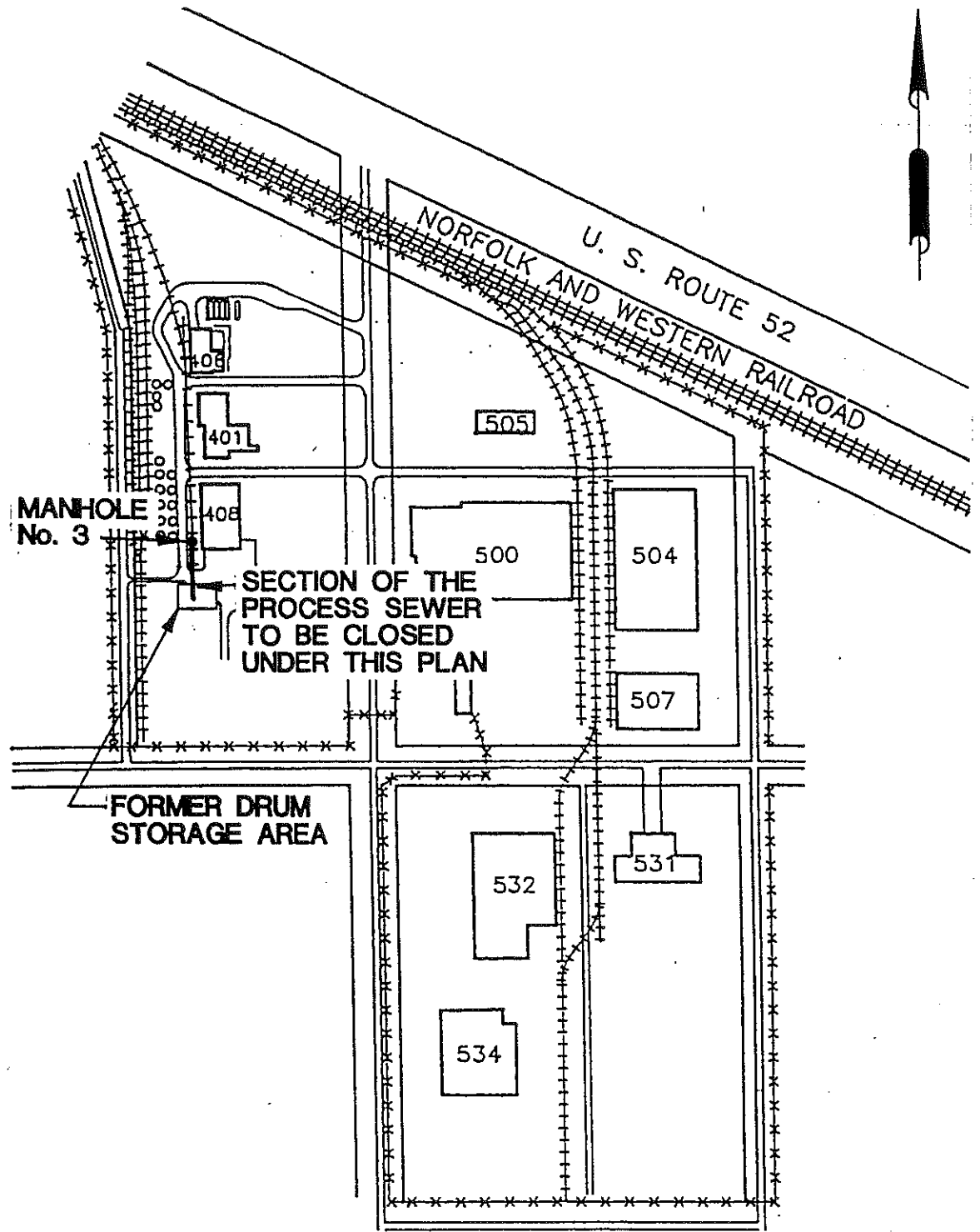
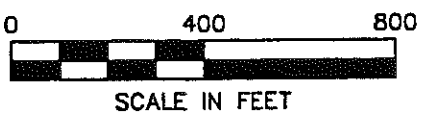
The U.S. EPA 1989 Preliminary Review and Inspection Report states the following for the Process Sewer System:

“...The process sewers are pre-formed cement pipes which have been packed with oakum caulking. Their integrity is unknown. They receive sump discharges from most sumps on site, forklift washwater, pellet car washwater, non-contact cooling water, cooling tower and boiler blowdown, and water from the truck loading area of the Styron plant... Process waters are likely to contain hazardous constituents including ethylbenzene, styrene, and acrylonitrile, as well as oil, dirt, solvents, and foam particles. Analytical data were not available to determine the concentrations of the constituents. All process waters are routed first to the Aerated Skimmer Basin (SWMU 39) for oil/water separation and aeration and then, together with the septic tank water, to the Wastewater Treatment System (SWMUs 31-35) for treatment... The Process Sewer System serves as a release control for most of the sewer system is unknown. No releases were documented from this unit...”

Constituents identified in the Part A permit application are provided in Table 1 including their names and their waste code identifications. It should be noted, however, that the Ohio EPA determined (see October 17, 1996 letter in Appendix A) that the contaminated soil in the Process Sewer Line Area which could contain styrene, ethylbenzene, and acrylonitrile, is not listed hazardous waste nor does it appear to exhibit hazardous waste characteristics. Therefore, soil excavated along the segment of the Process Sewer Line could be disposed as non-hazardous waste.

FILE: \\DOW\\HANGROCK\\80008007

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NOTE: ONLY MAIN FEATURES ARE SHOWN ON THIS PLAN.

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FACILITY LAYOUT AND THE LOCATION OF A SECTION OF THE PROCESS SEWER LINE TO BE CLOSED		
HANGING ROCK PLANT		
CLIENT: THE DOW CHEMICAL COMPANY		IRONTON, OH
SCALE: AS SHOWN		JOB NUMBER: 800080.30
FIGURE NUMBER	2	REV 0

Table 1. Constituents Listed under the Part A Permit Application**Dow Hanging Rock**

Constituent Name	Waste Code
Acrylonitrile Ethylbenzene Methylene Chloride Styrene	D001
Methylene Chloride	F002
Acrylonitrile	U009

2.4 Activities Leading to the Closure Plan

On April 26, 1991, the Ohio Environmental Protection Agency (OEPA) issued an order to perform a formal closure for the Former Drum Storage Area. Closure activities were conducted by OHM Remediation Services Corp. (OHM), and Dow Environmental Inc. (DEI), formerly AWD Technologies (AWD). Results of the February 1993 Phase III Closure Activities indicated a subsurface source of AN, EB, and ST, i.e., the section of the Process Sewer Line underlying the Former Drum Storage Area and to the north of this area, in addition to the surface source associated with the Former Drum Storage Area.

This section provides a summary of activities performed for both the Former Drum Storage Area and the Process Sewer Line leading to this Closure Plan.

2.4.1 Closure Activities

Closure activities for the Former Drum Storage Area were initiated by the OHM Remediation Services Corp (OHM) and started with the development of a closure plan in May 1991⁽²⁾. They continued with three phases of investigative activities that were driven by the findings and the need to obtain additional data on constituents concentrations in soil. An Amended Closure Plan was prepared in February 1993⁽³⁾. Results were summarized in a Preliminary Report for the RCRA Closure Activities performed at the RCRA Old Drum Storage Area in August 1993⁽⁴⁾.

The May 1991 Closure Plan⁽²⁾ recommended a verification soil sampling program based on the fact that the area was subjected to excavation of soil to mitigate constituents concentrations in soil and that the storage area was not used after 1980. The plan further stated that should the sampling results indicate constituents concentrations in soil, an assessment and/or excavation plan would be prepared. The OEPA approved the Closure Plan on November 4, 1991 (see Appendix A).

The Phase I closure activities were performed in May 1992. A total of 22 soil samples were collected from a 20 ft x 16.7 ft grid intervals, to a depth of up to 1 foot below ground surface (bgs). Soil samples were analyzed for acrylonitrile (AN), ethylbenzene (EB), methylene chloride (MC), and styrene (ST) using the U.S. EPA SW-846 test method 8240. Results of the analysis revealed that EB concentrations at three sampling locations exceeded the method detection limit, with the highest level being 2.76 mg/kg.

Results of the Phase I activities led to Phase II activities that were conducted in June 1992. Activities involved the excavation of two 16-foot x 16-foot areas that exhibited gray

stained soils and EB concentrations detected under Phase I. Excavation was performed to a depth of 1 to 1.5 feet bgs and resulted in off-site disposal of approximately 35 cubic yards (cy) of soil. Confirmatory soil samples indicated residual levels of EB (9 to 83 mg/kg)⁽⁴⁾ and led to the Phase III closure activities. The closure plan was amended to include additional soil investigation. The proposed investigation is summarized in the February 19, 1993 OHM report⁽³⁾.

Phase III activities were performed in February 1993⁽⁴⁾. Activities included the collection of 72 soil samples from 30 locations at varying depth intervals, up to a depth of 12 feet bgs. These samples were subjected to on-site soil-vapor analysis using mobile laboratory equipped with a laboratory-grade gas chromatograph (GC). Four of the soil samples also were sent off-site for laboratory analysis of AN, EB, MC, and ST using U.S. EPA SW-846 Method 8240. Nine of the locations showed one or more of the four constituents having soil-vapor concentrations above the method detection limit. The off-site laboratory analysis revealed one or more constituents concentrations above the method detection limit at three of the four sampled locations⁽⁴⁾.

Results of laboratory soil analysis for the three phases of activities are summarized in Table 2, and results of the Phase III soil-vapor analysis are summarized in Table 3. Figure 3 shows the soil sampling locations for Phase I and II activities, and Figure 4 shows the soil sampling locations for the Phase III activities.

The data for Phase III (see Tables 2 and 3) show that MC was found at locations 49A, 51A, 53A, and 55A. The depth of MC concentrations ranged from 2 to 3 feet at location 55A and from 8 to 9 feet at the other locations.

2.4.2 DEI Closure Activities

At this stage of the program, DEI (formerly AWD Technologies) continued with the closure activities. Cross-sections of soil-gas concentrations along the transect that included sampling locations 49A, 51A, 53A, and 55A (along the Process Sewer Line) were developed utilizing the Phase III data (see Table 3). Figure 5, which includes these cross-sections, illustrates that methylene chloride exhibits a pattern of dispersion that differs from that of the other three chemicals. Whereas methylene chloride concentrations decrease with depth indicating a surface source (i.e. the Former Drum Storage Area), the other three chemicals all display maximum concentrations at a depth (see Table 3, locations 11A, 46A, 49A, 51A, and 53A for examples) indicating a subsurface source (i.e. the Process Sewer Line running underneath the Former Drum Storage Area and to the north of this area at a depth of approximately 8 feet below ground surface).

**Table 2. Concentrations of Constituents Above Detection Limits
at the Former Drum Storage Area**

Dow Hanging Rock Plant

Soil Sampling Location	Depth (ft)	Concentrations of Indicated Constituents (mg/kg)			
		AN	EB	MC	ST
Phase I - May 1992					
8	0-1	<1.25	2.76	< 0.500	< 0.500
18	0-1	<1.25	0.510	< 0.500	< 0.500
23	0-1	<1.25	1.29	< 0.500	< 0.500
Phase II - June 1992					
32	0-1.5	BDL	9	BDL	BDL
36	0-1.5	BDL	9	BDL	BDL
37	0-1.5	BDL	83	BDL	BDL
Phase III - February 1993					
8A-1	8-9	< 0.13	< 0.005	< 0.005	< 0.005
20A-1	8-9	< 0.13	0.267	< 0.005	< 0.090
49A-2	5-6	0.106	0.559	1.57	0.051
49A-3	11-12	< 0.114	2.16	0.68	0.413

Results preceded by "less than" (<) were below the detection limit of the analytical instrument.

BDL: below method detection limit.

Phase I: included 22 soil sampling locations plus 2 equipment blank, 1 trip blank, and 2 duplicate samples. Only 3 samples resulted with constituents concentrations above the method detection limit.

Phase II: included 3 confirmatory soil sampling locations.

Phase III: included 4 split-soil samples that were subjected to off-site laboratory analysis and 72 soil samples that were subjected to soil GC analyses (see Table 3).

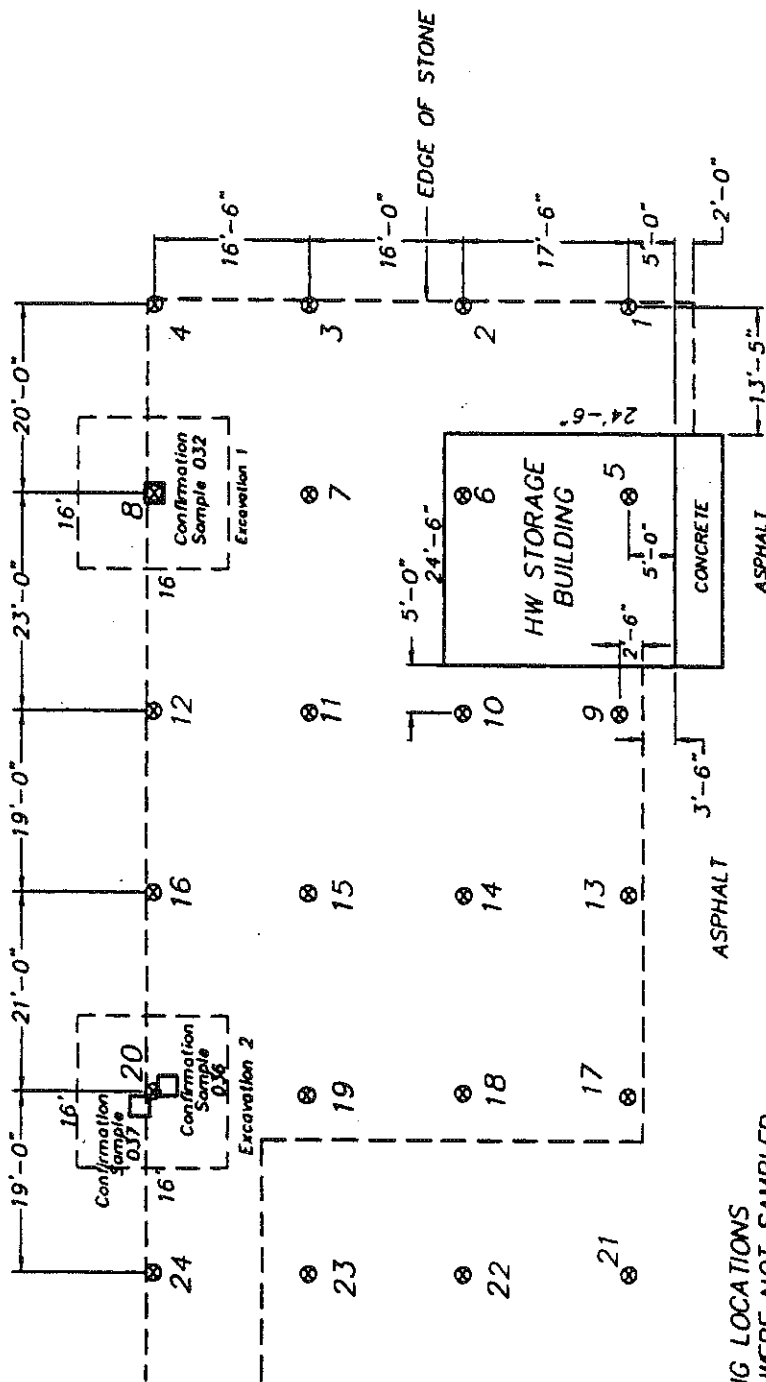
**Table 3. Phase III Soil-Gas Constituents Concentrations at the Former Drum Storage Area
Dow Hanging Rock Plant**

Depth Below Surface (Ft)	Constituent	Soil-Gas Concentration (ppm) at the Indicated Locations																													
		3A	4A	7A	8A	11A	12A	15A	16A	19A	20A	23A	24A	40A	41A	42A	43A	44A	45A	46A	47A	48A	49A	50A	51A	52A	53A	54A	55A	56A	57A
2 to 3	EB	ND	ND	ND	--	0.701	ND	ND	0.149	0.016	--	ND	ND	ND	ND	ND	ND	ND	ND	0.328	ND	0.023	0.189	ND	0.735	0.224	0.36	0.037	0.42	ND	ND
	AN	ND	ND	ND	--	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ST	ND	ND	ND	--	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	MC	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.81	ND	0.447	ND	0.254	ND	0.14	ND	ND
5 to 6	EB	ND	ND	ND	0.533	4.17	ND	ND	ND	ND	1.03	ND	ND	ND	ND	ND	ND	ND	ND	3.58	ND	ND	1.13	ND	1.14	ND	1.76	0.39	ND	ND	ND
	AN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ST	ND	ND	ND	ND	0.228	ND	ND	ND	ND	0.67	ND	ND	ND	ND	ND	ND	ND	ND	0.409	ND	ND	0.242	ND	0.331	ND	0.728	0.135	ND	ND	ND
	MC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.75	ND	0.874	ND	0.724	ND	ND	ND	ND	ND
8 to 9	EB	--	--	--	--	13.1	--	--	--	--	0.108	--	--	--	--	--	--	--	--	1.48	--	--	6.86	--	2.0	--	5.79	--	--	--	--
	AN	--	--	--	--	4.83	--	--	--	--	ND	--	--	--	--	--	--	--	--	ND	--	--	ND	--	ND	--	ND	--	--	--	--
	ST	--	--	--	--	1.26	--	--	--	--	ND	--	--	--	--	--	--	--	--	0.182	--	--	1.91	--	0.542	--	0.393	--	--	--	--
	MC	--	--	--	--	ND	--	--	--	--	ND	--	--	--	--	--	--	--	--	ND	--	--	1.36	--	0.818	--	0.385	--	--	--	--
11 to 12	EB	--	--	--	--	0.089	--	--	--	--	--	--	--	--	--	--	--	--	--	0.251	--	--	10.0	--	2.72	--	4.38	--	--	--	--
	AN	--	--	--	--	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	6.78	--	--	11.9	--	ND	--	ND	--	--	--	--
	ST	--	--	--	--	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--	1.93	--	1.38	--	3.18	--	--	--	--
	MC	--	--	--	--	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--	ND	--	ND	--	ND	--	--	--	--

NOTES:

-- : Denotes no sample collected at this depth
ND : Denotes not detected

Soil-gas concentrations were measured by an on-site mobile laboratory equipped with a laboratory-grade G-C.
Phase III field sampling and analysis activities were performed in February 1993.

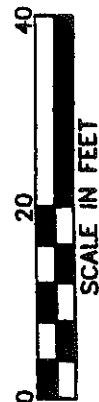


LEGEND

- ⊗ PHASE I SOIL SAMPLING LOCATIONS (LOCATIONS 5 AND 6 WERE NOT SAMPLED BECAUSE OF CONCRETE FLOOR) SAMPLING DEPTH 0-1 ft
- PHASE II CONFIRMATORY SAMPLING LOCATIONS (LOCATIONS 5 AND 6 TAKEN AT SAMPLING DEPTH 1.5 ft. (SAMPLE 32 TAKEN AT SAME HORIZONTAL LOCATION AS PHASE I SAMPLE 8))

REFERENCE

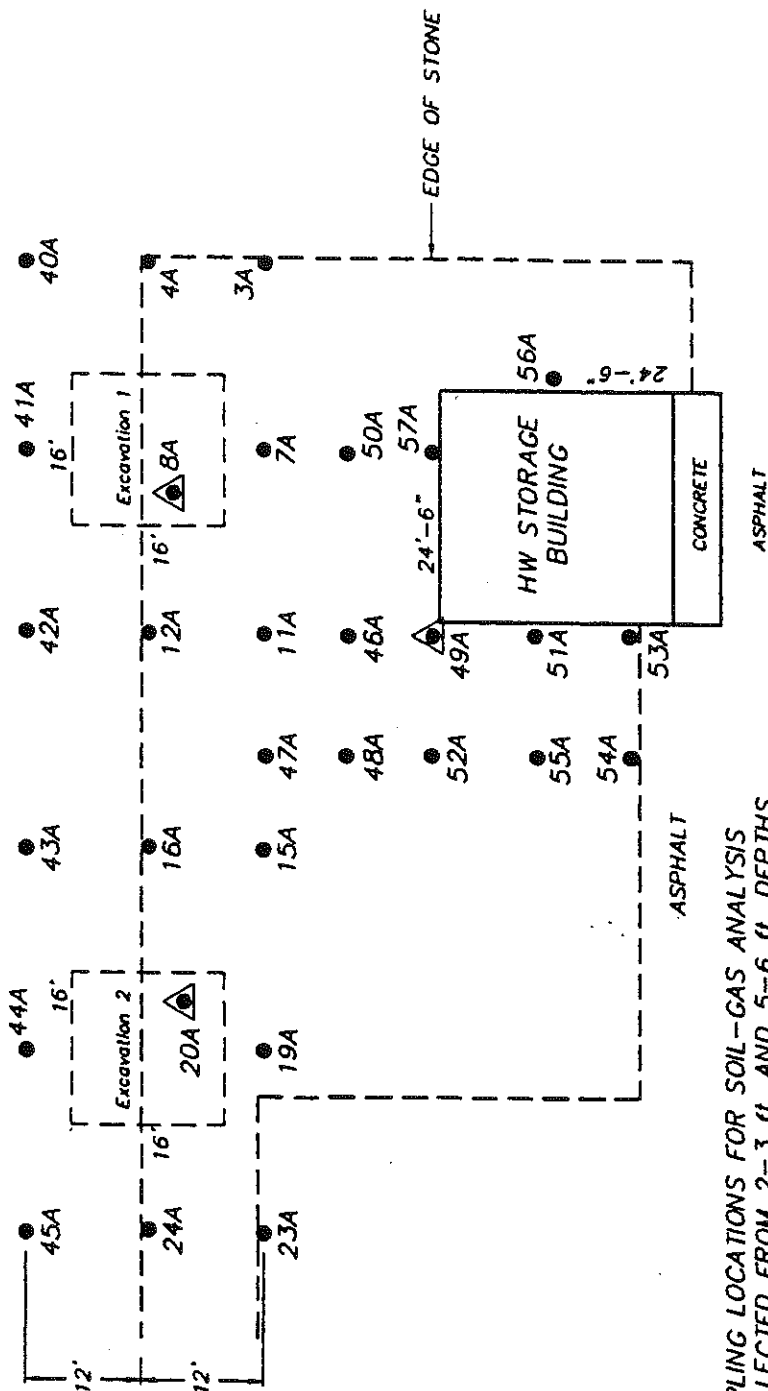
BASE MAP TAKEN FROM OHM CORPORATION'S
FIGURE 2.3 OF PROJECT No. 12299.



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FORMER DRUM STORAGE AREA			
PHASE I AND II SOIL SAMPLING LOCATIONS			
HANGING ROCK PLANT			
IRONTON, OH			
CLIENT: DOW CHEMICAL COMPANY	JOB NUMBER: 7015-700		
SCALE: AS SHOWN	FIGURE NUMBER: 3	REV: 0	0

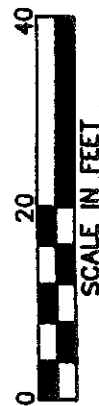


LEGEND

- PHASE III SOIL SAMPLING LOCATIONS FOR SOIL-GAS ANALYSIS (SAMPLES WERE COLLECTED FROM 2-3 ft. AND 5-6 ft. DEPTHS AT ALL LOCATIONS, FROM 8-9 ft. DEPTHS AT SAMPLING LOCATIONS 2A AND 8A, AND FROM 8-9 AND 11-12 ft. FROM SAMPLING LOCATIONS 11A, 46A, 49A, 51A, AND 53A. A TOTAL OF 72 SAMPLES WERE SUBJECT TO SOIL GAS AND GC ANALYSIS)
- ▲ PHASE III SOIL SAMPLING LOCATIONS FOR OFF-SITE LABORATORY ANALYSIS (8A-1 (8-9ft. DEPTH), 20A-1 (8-9ft. DEPTH), 49A-2 (5-6 ft. DEPTH) AND 49A-3 (11-12 ft. DEPTH))

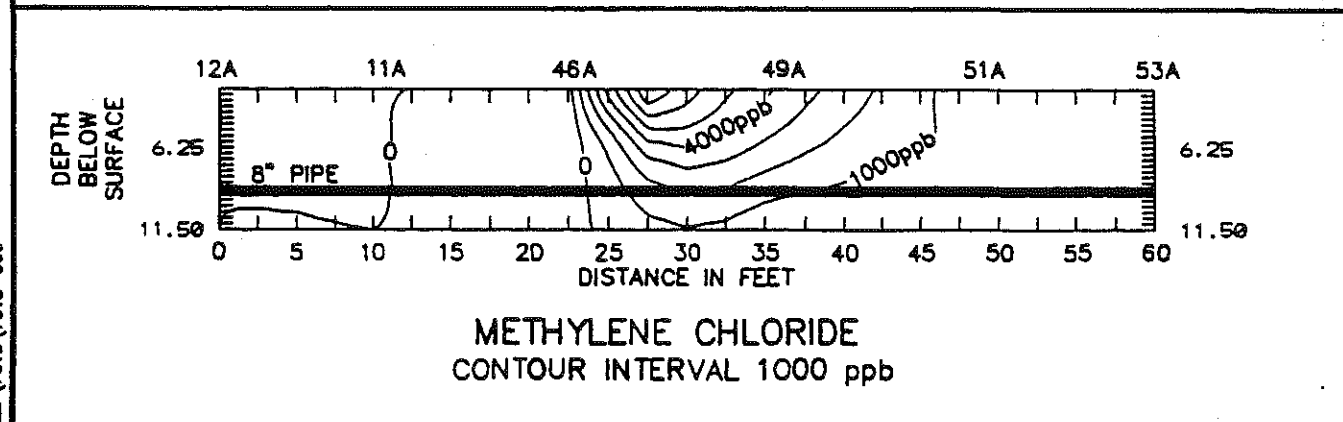
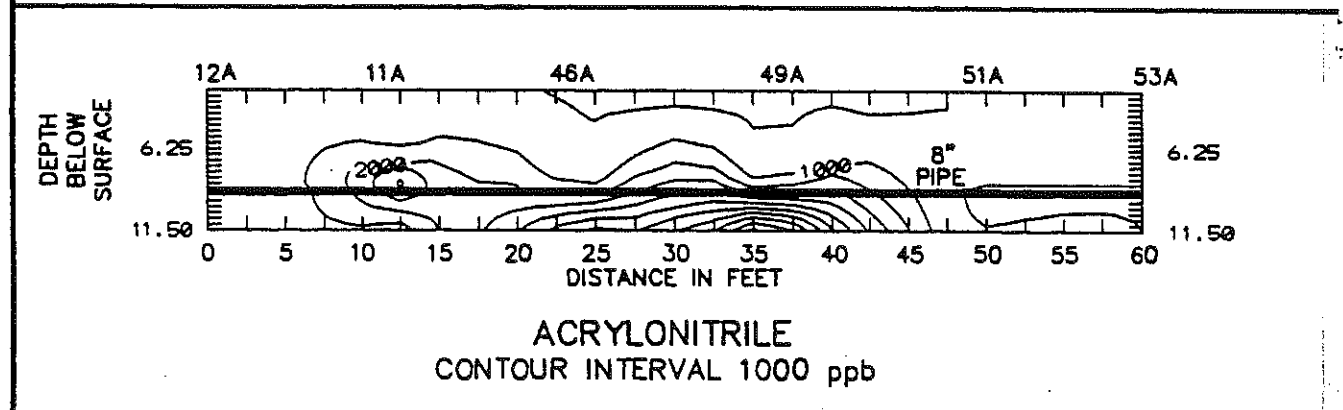
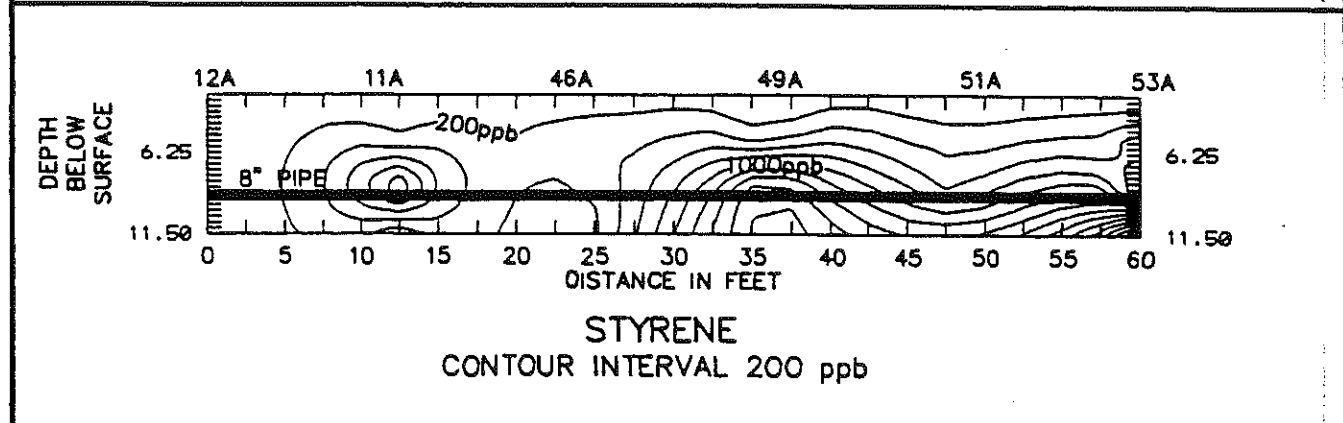
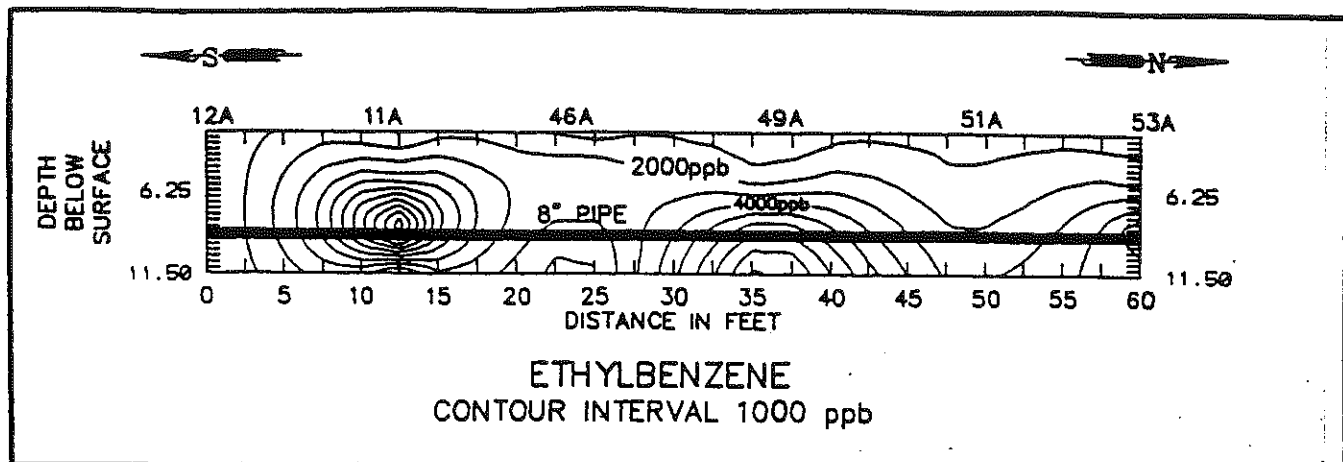
REFERENCE

BASE MAP TAKEN FROM OHM CORPORATION'S
FIGURE 2.3 OF PROJECT No. 12299.



RADIANT
INTERNATIONAL LLC

FORMER DRUM STORAGE AREA PHASE III SOIL SAMPLING LOCATIONS	
HANGING ROCK PLANT IRONTON, OH	
CLIENT: DOW CHEMICAL COMPANY	JOB NUMBER: 7015-700
SCALE: AS SHOWN	FIGURE NUMBER: 4
REV: 0	0



FILE: 7015\7015-009

RADIAN
INTERNATIONAL LLC

CONSTITUENTS CONCENTRATIONS IN PPB ALONG A
CROSS SECTION PARALLEL TO THE PROCESS SEWER
PIPELINE AT THE FORMER DRUM STORAGE AREA
HANGING ROCK PLANT IRONTON, OH

CLIENT: DOW CHEMICAL COMPANY JOB NUMBER: 7015-700

SCALE: AS SHOWN FIGURE NUMBER: 5 REV: 0

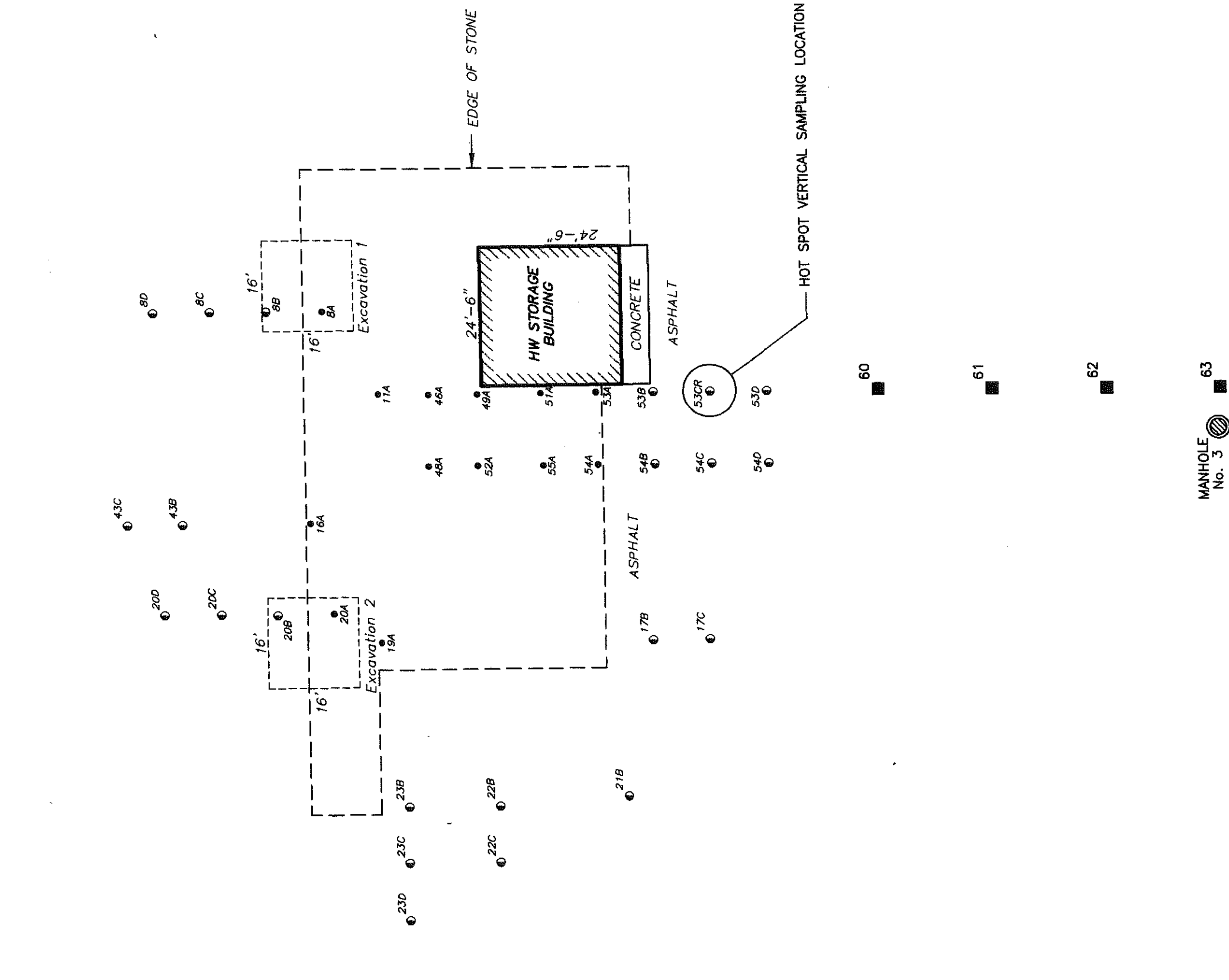
A pipeline investigation was subsequently performed on July 21, 1993. The study, which is included as Appendix B, indicated that there was evidence that the Process Sewer Line underlying the Former Drum Storage Area could be the source of AN, ST, and EB contamination. OEPA accepted Dow's interpretation of the subsurface contamination source on August 25, 1993 (see Appendix A). At that time, OEPA recommended that Dow submit a Closure Plan Modification for the Former Drum Storage Area. The Closure Plan Modification was submitted in September 1993⁽⁵⁾.

Comments on the Closure Plan Modification were received from OEPA, Division of Hazardous Waste Management (DHWM) in August 1994. Draft revisions to the Closure Plan Modification were submitted to the OEPA on August 29, 1994⁽⁶⁾. Following review of the draft revisions, the OEPA requested that the extent of the four previously-identified volatile organics in soil be adequately defined including the area to the north of the Former Drum Storage Area. This led to Phase IV closure activities that included additional soil sampling and a proposed management plan for the Former Drum Storage Area. The Phase IV activities were performed in October 1994. Appendix C includes the report that summarizes the Phase IV activities.

A total of 78 soil samples were collected during the Phase IV field activities, from 35 sampling locations shown in Figure 6. Sixty-seven samples were analyzed for AN, EB, MC, and ST using the U.S. EPA SW-846 Method 8240A. The remaining 11 were not analyzed because data from those sampled locations were not needed to identify three decreasing points of concentration. Results of the Phase IV soil analyses are shown in Table 4. Laboratory analysis results and data validation records are included in the March 1995 report in Appendix C. The data in Table 4 show that constituents concentrations were below 0.4 mg/kg, to a depth of 4 feet, with the exception of location 51A (Figure 6) that exhibited EB concentrations of 17 mg/kg and MC concentrations of 7.6 mg/kg.

The highest constituents concentrations were detected between 5 to 7 feet bgs, with the highest EB and ST concentrations occurring at locations 53B at a depth of 6 feet bgs which is the mid-point of the 2-foot sample interval (1,400 mg/kg of EB and 950 mg/kg of ST). Locations 53B, 53C, and 53D exhibited occurrence of VOC constituents to a depth of 7 to 9 feet bgs, and location 53C to a depth of 9 to 11 feet bgs.

The data collected along the south-north transect between sample points 11A and 53B (which coincides with the subsurface Process Sewer Line that transects the Former Drum



LEGEND

- — — — — APPROXIMATE EXTENT OF
 DRUM STORAGE AREA
 ● PHASE III AND IV SAMPLE POINT
 ① PHASE IV SAMPLE POINT
 ■ SUPPLEMENTAL PHASE IV SAMPLE POINT
 53CR
 ① HOT SPOT SAMPLING POINT



REFERENCE

BASE MAP TAKEN FROM OHM CORPORATION'S
FIGURE 2.3 OF PROJECT No. 12299.

RADIAN
INTERNATIONAL LLC

FORMER DRUM STORAGE AREA & PROCESS SEWER LINE
PHASE IV & SUPPLEMENTAL PHASE IV SAMPLE LOCATIONS

HANGING ROCK PLANT

CLIENT: THE DOW CHEMICAL COMPANY

SCALE: AS SHOWN

FIGURE
NUMBER

6

REV 0

**Table 4. Phase IV Concentrations of Constituents Above Detection Limits at the Former Drum Storage Area
Dow Hanging Rock Plant**

Depth(ft) ^(b)	Analyte ^(c)	Dry Weight concentration (ug/kg) at Sample Location ^(a)																																			
		3A	8B	8C	8D	11A	16A	17B	17C	19A	20A	20B	20C	20D	21B	22B	23B	23C	43B	43C	46A	48A	49A	51A	52A	53A	53B	53C	53D	54A	54B	54C	55A	BG-1	BG-2	BG-3	
1	EB	--	<6	<6	<6	--	--	--	--	--	--	7	<6	<6	--	--	--	--	9	<6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	AN	--	<120	<110	<120	--	--	--	--	--	--	<120	<110	<110	--	--	--	--	<110	<110	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	ST	--	<6	<6	<6	--	--	--	--	--	--	<6	<6	<6	--	--	--	--	<6	<6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	MC	--	<6	<6	<6	--	--	--	--	--	--	<6	7	<6	--	--	--	--	<6	<6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
2	EB	--	--	--	--	--	--	<6	<6	--	--	--	--	--	<6	<6	<6	<6	--	--	--	--	--	--	--	76	30 ^(d)	10	--	<6	<6	--	--	--	--		
	AN	--	--	--	--	--	--	<120	<120	--	--	--	--	--	<120	<120	<120	<120	--	--	--	--	--	--	--	<120	<120	<120	--	<120	<120	--	--	--	--		
	ST	--	--	--	--	--	--	<6	<6	--	--	--	--	--	<6	<6	<6	<6	--	--	--	--	--	--	--	88	74 ^(d)	<6	--	<6	<6	--	--	--	--		
	MC	--	--	--	--	--	--	<6	<6	--	--	--	--	--	<6	<6	<6	<6	--	--	--	--	--	--	--	<6	<6	<6	--	<6	<6	--	--	--	--		
3	EB	--	200	<6	<6	8	<6	--	--	<6	--	<6	<6	<6	--	--	--	--	--	--	23	<6	550	17,000	<6	10	--	--	<6	--	--	<6	--	--	--		
	AN	--	<120	<120	<120	<120	<120	--	--	<120	--	<120	<120	<120	--	--	--	--	--	<120	<120	<120	<16,000	<120	<120	--	--	--	<120	--	--	<120	--	--	--		
	ST	--	<6	<6	<6	17	<6	--	--	<6	--	<6	<6	<6	--	--	--	--	--	14	<6	350	7,600	<6	<6	--	--	<6	--	--	<6	--	--	<120	--	--	
	MC	--	<6	<6	<6	<6	<6	--	--	<6	--	<6	<6	<6	--	--	--	--	--	<6	<6	<6	<760	<6	<6	--	--	<6	--	--	<6	--	--	<6	--	--	
4	EB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	33	160	120	--	<6	<6	--	--	--	--		
	AN	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<120	<120	<120	--	<120	<120	--	--	--	--		
	ST	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	38	280	63	--	<6	<6	--	--	--	--		
	MC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<6	<6	<6	--	<6	<6	--	--	--	--		
5	EB	<6	<6	<6	<6	570,000	--	--	--	--	90	28	<6	<6	--	--	--	--	--	--	1,200	--	99,000	22,000	--	2,200	--	--	<6	--	--	--	--	--	--		
	AN	<120	<130	<130	<130	<540,000	--	--	--	--	<120	<120	<120	<120	--	--	--	--	--	<120	--	<55,000	<16,000	--	<620	--	--	<120	--	--	--	--	--	--	--		
	ST	<6	1,500	<6	<6	530,000	--	--	--	--	57	47	<6	<6	--	--	--	--	--	320	--	60,000	12,000	--	3,400	--	--	<6	--	--	--	--	--	--	--		
	MC	<6	<6	<6	<6	<27,000	--	--	--	--	<6	<6	<6	<6	--	--	--	--	--	<6	--	<2,700	<780	--	<31	--	--	<6	--	--	--	--	--	--	--		
6	EB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,400,000	400	260	--	<6	<6	--	--	--	--		
	AN	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<670,000	<120	270	--	<120	<120	--	--	--	--		
	ST	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	950,000	540	300	--	<6	<6	--	--	--	--		
	MC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<33,000	<6	18	--	9	<6	--	--	--	--		
7	EB	--	--	--	--	--	--	--	--	--	--	27	<6	<6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	AN	--	--	--	--	--	--	--	--	--	--	<130	<120	<120	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	ST	--	--	--	--	--	--	--	--	--	--	53	<6	<6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	MC	--	--	--	--	--	--	--	--	--	--	<6	<6	<6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
8	EB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	210,000	520,000	870	--	--	--	--	--	--	--		
	AN	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<160,000	<160,000	190	--	--	--	--	--	--	--		
	ST	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	81,000	200,000	490	--	--	--	--	--	--	--		
	MC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<7,900	<7,900	40	--	--	--	--	--	--	--		
10	EB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	170,000	--	--	--	--	--	--	--	--	--		
	AN	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<170,000	--	--	--	--	--	--	--	--		
	ST	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	54,000	--	--	--	--	--	--	--	--		
	MC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<8,100	--	--	--	--	--	--	--	--		

(a) "<" indicates below detection limit, non-detected analytes are reported as the limit of quantitation, for example, the method detection limit for EB for sample 8B is 6 ug/kg; "--" indicates "not sampled".

(b) Midpoint of the 2-foot sample interval - depth below surface.

(c) "EB" - ethylbenzene; "AN" = acrylonitrile; "ST" = styrene; "MC" = methylene chloride.

Phase IV field sampling and analysis activities were performed in October 1994.

Laboratory analysis results and data validation records are included in the March 1995 Report in Appendix D.

Storage Area at approximately 8 feet bgs), clearly indicate a distinct subsurface source of EB and ST concentrations at location 53B. As shown in Figures 7 and 8, concentrations decrease away from the maxima at a depth of 5 to 7 feet. In addition, a maximum subsurface concentration of EB and ST is indicated at location 11A at a depth of 4 to 6 feet bgs.

Based on the Phase IV investigation findings, OEPA concluded in a letter sent to Dow in October 1995 (see Appendix A), that additional sampling was required to assess the horizontal and vertical extent of constituents in soil adjacent to the Process Sewer Line to the north of the Former Drum Storage Area. This led to a supplemental Phase IV study that was conducted in January 1996. The study had the following objectives:

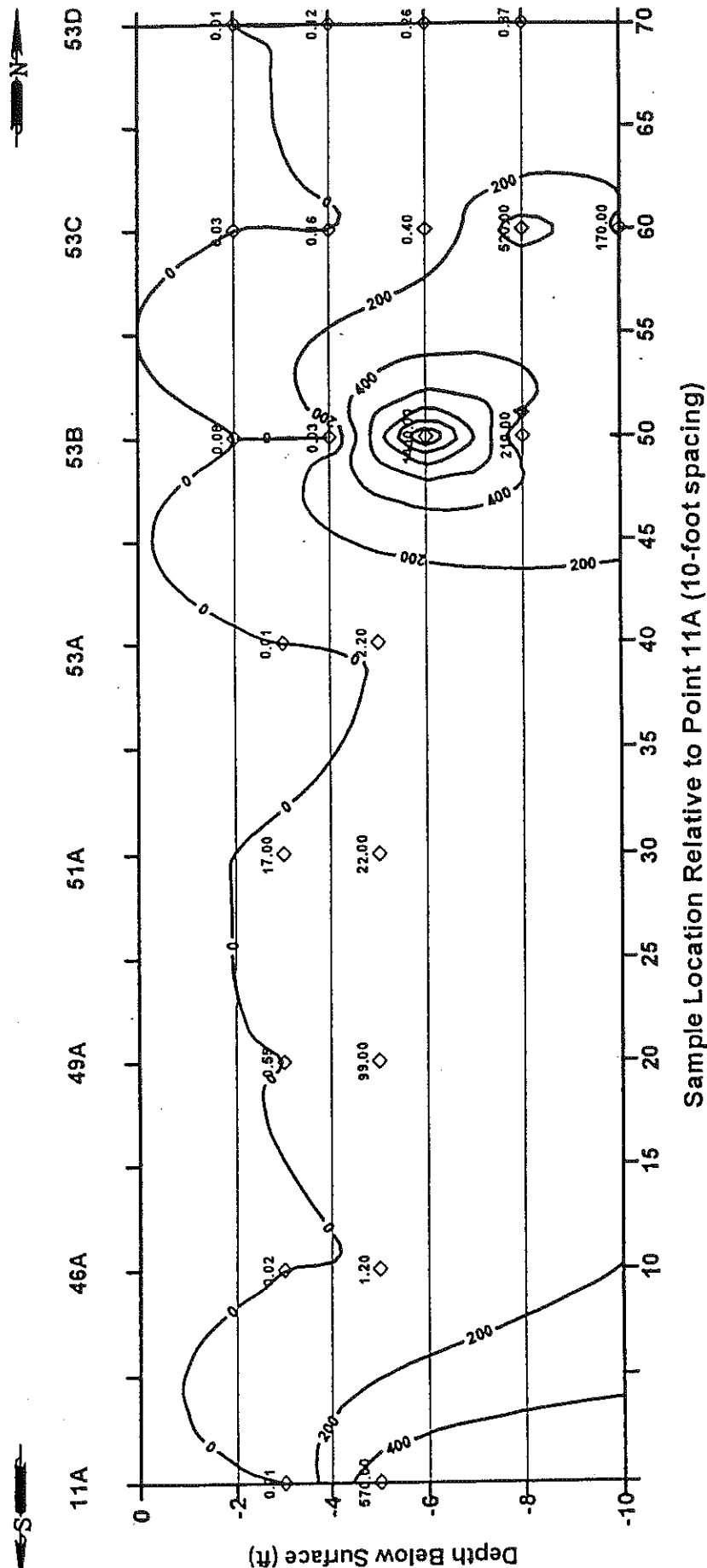
- Collection of additional soil samples to define the northern extent of constituents along the Process Sewer Line. Constituents analyzed for were AN, EB, MC, and ST;
- Collection of soil samples at location 53C to determine the vertical extent of constituents. This included the need for collecting three consecutive samples that resulted in non-detect field screening including a confirmatory sample taken from the bottom of the boring for off-site laboratory analysis; and
- Interpretation of soil data to determine the extent of constituents concentrations and whether constituents in soil reached groundwater.

Details of this study are provided in the DEI, March 1996 Report (see Appendix C for details). Table 5 summarizes the soil vapor headspace analysis results, and Table 6 provides results of the five soil samples that were subjected to analysis using the U.S. EPA SW-846 Method 8240A. Laboratory analysis results and data validation records are included in the March 1996 report in Appendix C. Figure 6 shows the soil sampling locations and Figure 9 visually portrays the extent of constituents in soil.

In addition, the OPEA strongly encouraged Dow in their October 1995 letter to remedy the Process Sewer Line release from segments underlying the Drum Storage Area and to the north up to Manhole No. 3, rather than waiting for the agency to take a legal action.

The March 1996 Supplemental Phase IV Sampling Report included results of the hydrogeological investigation along a section of the Process Sewer Line north of the Former Drum Storage Area and up to manhole No. 3 (see Figure 6). Highlights of these results include:

SOUTH - NORTH SOIL SAMPLING LOCATIONS TRANSECT

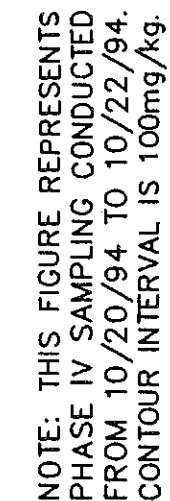


VERTICAL PROFILE OF ETHYLBENZENE CONCENTRATIONS
IN SOIL (mg/kg) ALONG THE SOUTH-NORTH TRANSECT
BETWEEN SAMPLE POINTS 11A AND 53B
HANGING ROCK PLANT

CLIENT: DOW CHEMICAL COMPANY
JOB NUMBER: 7015-700
SCALE: NONE
FIGURE NUMBER: 7
REV: 0



NOTE: THIS FIGURE REPRESENTS
PHASE IV SAMPLING CONDUCTED
FROM 10/20/94 TO 10/22/94.
CONTOUR INTERVAL IS 200mg/kg.



VERTICAL PROFILE OF STYRENE CONCENTRATIONS IN SOIL (mg/kg) ALONG THE SOUTH-NORTH TRANSECT BETWEEN SAMPLE POINTS 11A AND 53B HANGING ROCK PLANT		IRONTON, OH
CLIENT: DOW CHEMICAL COMPANY	JOB NUMBER: 7015-700	
SCALE: NONE	FIGURE NUMBER	8 0 REV

Table 5. Supplemental Phase IV Organic Vapor Headspace Concentrations for the Soil Boring Samples Along the Process Sewer Line as a Function of Depth

Dow Hanging Rock

Depth (ft-bgs)	Organic Vapor Headspace Concentration (ppm) at the Indicated Soil Boring				
	SB-53CR	SB-60	SB-61	SB-62	SB-63
6-8	85	175	78	34	2559
8-10	226	494	102	36	439
10-12	1004	532	741	ND	48
12-14	7.3	290	ND	ND	7.3
14-16	ND	NM	9.7		7.3
16-18	34	NM			4.8
18-20	ND	78			4.8
20-22	ND	NM			
22-24	ND	7.3			

ND = non-detected

NM = not measured

Supplemental Phase IV field sampling and analysis activities were performed in January 1996.

Table 6. Supplemental Phase IV Soil Volatile Organic Compound (VOC) Concentrations for Samples Along the Process Sewer Line

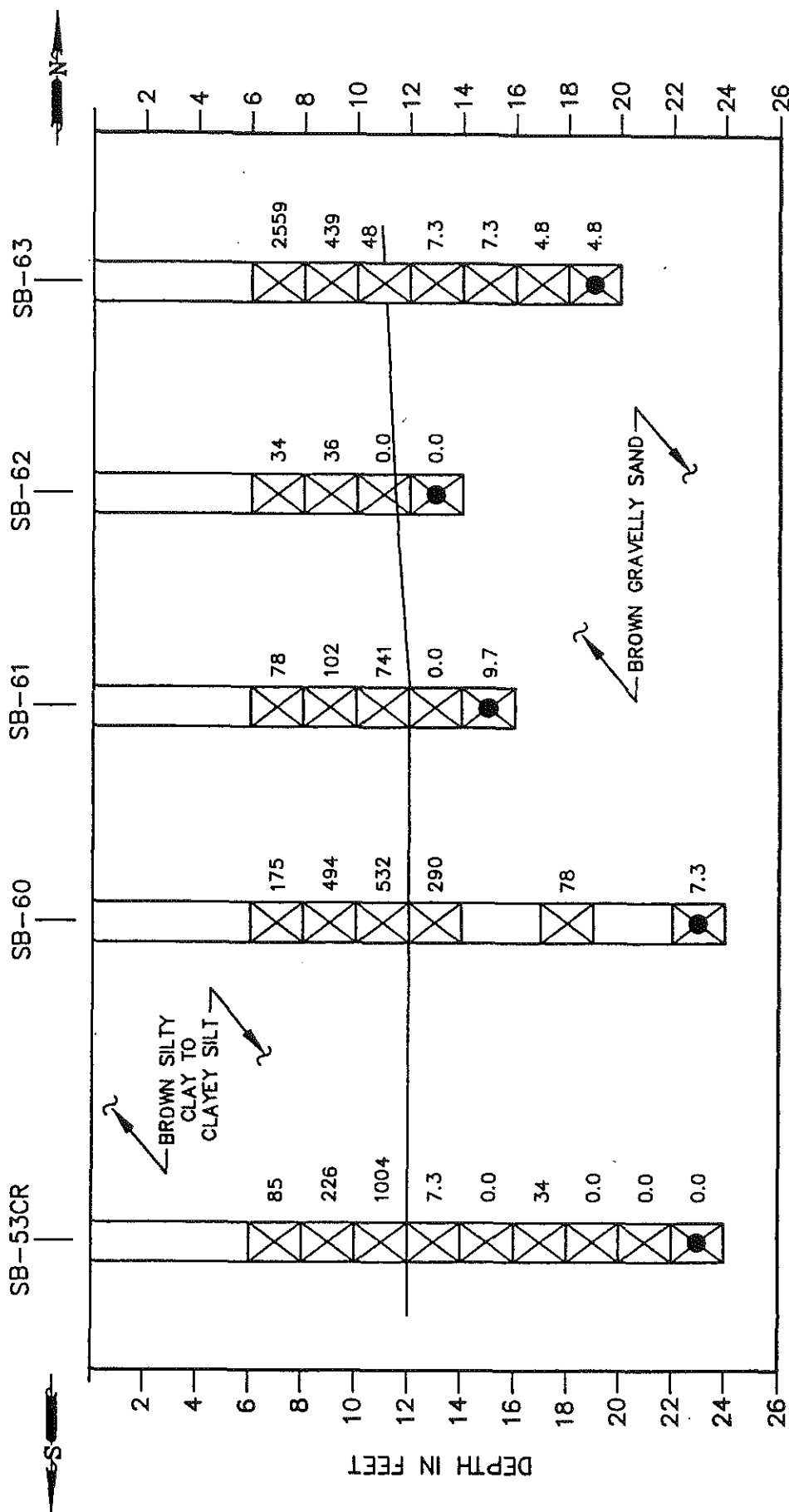
Dow Hanging Rock

	Volatile Organic Concentrations (No.g/kg) at Indicated Soil Boring									
	SB-63		SB-62		SB-61		SB-60		SB-53CR	
Chloromethane	10	U	10	U	10	U	10	U	10	U
Bromomethane	10	U	10	U	10	U	10	U	10	U
Vinyl Chloride	10	U	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U
Methylene Chloride	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acetone	23		15		10	U	10	U	22	
Carbon DiSulfide	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1-Dichloroethene	5.0		5.0	U	5.0	U	5.0	U	5.0	U
1,1-Dichloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichloroethene (total)	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chloroform	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Butanone	10	U	10	U	10	U	10	U	10	U
1,1,1-Trichloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbon Tetrachloride	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Vinyl Acetate	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1,2,2-Tetrachloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichloropropane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
trans-1,3-Dichloropropene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Trichloroethene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibromochloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1,2-Trichloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
cis-1,3-Trichloropropene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Chloroethyl Vinyl Ether	200	U	200	U	200	U	200	U	200	U
Bromoform	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-Pentanone	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Toluene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Ethylbenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Styrene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Xylenes (total)	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Sampling Depth	Sampled from 18-20 ft.		Sampled from 13-14 ft.		Sampled from 14-16 ft.		Sampled from 22-24 ft.		Sampled from 22-24 ft.	

U = Nondetected, Number indicates detection limits

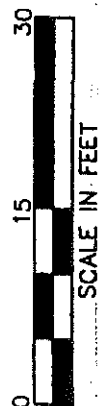
Supplemental Phase IV field sampling and analysis activities were performed in January 1996.

Laboratory analysis results and data validation records are included in the March 1996 Report in Appendix D.



LEGEND

- 7.3 SAMPLE INTERVAL AND HEADSPACE ORGANIC VAPOR RESULT (ppm)
- LABORATORY ANALYTICAL SAMPLE RESULT OF NON-DETECT
- SOIL BORING



071162956KKG

RADIAN INTERNATIONAL LLC

ORGANIC SOIL VAPOR & LABORATORY ANALYTICAL RESULTS
FROM SOIL BORINGS ALONG THE PROCESS SEWER LINE
NORTH OF THE FORMER DRUM STORAGE AREA
HANGING ROCK PLANT IRONTON, OH

CLIENT: THE DOW CHEMICAL COMPANY JOB NUMBER: 7015-700

SCALE: AS SHOWN FIGURE NUMBER: 9 REV: 0

- The Process Sewer Line is buried within an unconsolidated clayey silt to silty clay formation which extends to a depth of about 11 to 12 feet bgs;
- A well-defined contact separates the upper clayey silt to silty clay layer from the underlying gravelly sand formation, which is characterized as medium dense, well-graded, light brown and moist; and
- No saturated subsurface conditions, nor groundwater were encountered during the field activities to a depth of 24 feet bgs along the 100-foot section that was investigated. All soil borings were completely within the unsaturated zone.

The Supplemental Phase IV Sampling Report also included results of the vertical extent of constituents concentrations in soil. Highlights of these results are (see Appendix C for details):

- Organic vapor headspace concentrations decreased with depth below the Process Sewer Line (approximately 8 feet bgs) and manhole No. 3;
- The constituents concentrations in soil were confined primarily to the clayey silt to silty clay overlying the gravelly sand formation (i.e., to a depth of 11 to 12 feet bgs);
- Headspace soil samples collected for three consecutive sampling intervals (18-20, 20-22, and 22-24 feet) at the location which exhibited in previous investigations, the highest constituents concentrations in soil at a depth of 10 feet (SB-53C), resulted in non-detected organic vapors;
- Soil samples that were collected to confirm the non-detected organic vapors in the headspace samples from the bottom of each soil boring were analyzed using U.S. EPA SW-846 Method 8240. Results of the analysis were below the method detection limit for each of the soil samples and for each of the VOCs analyzed for, including AN, EB, MC and ST. The laboratory analysis results confirmed the headspace results; and
- The results of the hydrogeological investigation and the vertical extent of constituents concentrations in soil clearly show that organic constituents in soil are primarily confined to the Process Sewer Line Area and are primarily detected in the clayey silt to silty clay layer (i.e. 11 to 12 feet bgs). This, together with the fact that no groundwater was encountered in any of the five soil borings down to a depth of 24 feet bgs, and no constituents concentrations were detected at this depth, eliminates the concern about constituents migration to groundwater and the need to consider this matter in any proposed closure action.

Based on these results Dow proposed in April 1996 to OEPA, a closure for the Former Drum Storage Area and a section of the Process Sewer Line underlaying the Former Drum Storage Area and extending to the north to Manhole No. 3, which included the following actions:

- Excavate and dispose of soil from the area of the Process Sewer Line underlying the Former Drum Storage Area, in accordance with RCRA requirements. The excavation will involve a length of approximately 50 feet, a width of approximately 4 feet, and a

depth of 12 feet. This will result in removing approximately 90 cubic yards of soil along and below the sewer line, from locations that consistently exhibited the highest constituents concentrations in previous investigations;

- Perform additional soil excavation to provide the space for the proposed collection sump. The estimated volume to be excavated and disposed of in accordance with RCRA requirements, is approximately 450 cubic yards. (The original estimated volume of soil associated with the construction of the sump was revised from approximately 150 to 450 cy including selective excavation); and
- Perform risk-based closure of the Former Drum Storage Area and the Process Sewer Line underlying it. The health risk assessment will address only constituents concentrations in soil and will exclude the groundwater exposure pathways because of reasons discussed under the summary of hydrogeological conditions and the vertical extent of constituents concentrations in soil which showed no presence of groundwater and no migration of constituents to the depth of soil investigated. Results of the risk assessment will define the soil cleanup levels. Any additional excavation and disposal will be done according to these cleanup levels.

In addition, in response to OEPA recommendations in their October 1995 letter (see Appendix A) to remedy the Process Sewer Line release, Dow proposed a closure for the section of the Process Sewer Line extending to the north of the Former Drum Storage Area to Manhole No. 3. The proposed closure for this part of the Process Sewer Line included the following actions:

- Excavate and dispose of soil from the area of the Process Sewer Line extending to the north of the Former Drum Storage Area to manhole No. 3 (see Figure 6) in accordance with RCRA requirements. This excavation will involve a length of approximately 100 feet, a width of approximately 4 feet, and a depth of up to 12 feet. This will result in removing approximately 180 cubic yards of soil along and below the sewer line, from locations that exhibited high constituents concentrations in previous investigations; and
- Perform a risk-based closure of this portion of the Process Sewer Line area. The health risk assessment will address only constituents concentrations in soil and will exclude the groundwater exposure pathways because of the same reasons discussed under the proposed closure for the Former Drum Storage Area. Results of the risk assessment will define the soil cleanup levels. Any additional soil excavation and disposal will be done according to these cleanup levels.

To implement these tasks, Dow proposed to revise the draft Closure Plan for the Former Drum Storage Area and prepare a Closure Plan for a section of the Process Sewer Line to reflect the above-proposed actions. In May 1996, OEPA responded to the Dow proposed closure

activities (see Appendix A). In their letter the OEPA concurred with the April 1996 Dow-proposed approach and agreed that the groundwater pathway need not be considered in the risk assessment for soils in the Former Drum Storage Area and the section of the Process Sewer Line underlaying the Former Drum Storage Area and extending to the north to Manhole No. 3. The OEPA May 1996 letter led to the preparation of this Closure Plan which addresses the closure of the section of the Process Sewer Line underlaying the Former Drum Storage Area and extending to the north to Manhole No. 3. The closure of the Former Drum Storage Area is addressed in a separate closure plan document⁽⁷⁾.

2.5 Sources and Extent of Constituents

As discussed in Sections 2.2 and 2.3, the use of the Process Sewer Line, a portion of which underlays the storage area and extending north to Manhole No. 3 (approximately 150 feet long), coupled with the use of the Former Drum Storage Area, resulted in the presence of AN, EB, MC, and ST in several locations in the soil. Data from past investigations indicated that MC is associated with a surface source (i.e. drum storage activities) and the other three chemicals displayed concentrations at a depth and location indicating a subsurface source (i.e. the Process Sewer Line).

No sources of constituents concentration exist in the Process Sewer Line from Manhole No. 3 to the south to the wastewater plant since the use of this section was ceased in late 1993 and replaced by an above ground temporary line. This closure addresses the portion of Process Sewer Line north of the Former Drum Storage Area to Manhole No. 3 (approximately 100 feet long). The Amended Closure Plan for the former Drum Storage Area also addresses the closure of the section of the Process Sewer Line underlaying this area. Closure of the Former Drum Storage Area without addressing the Process Sewer Line may leave in place high constituents concentrations in certain subsurface locations. Recognizing this fact, Dow decided to take this action of closing a portion of the Process Sewer Line in conjunction with the closure of the Former Drum Storage Area, although they represent two separate SWMUs and consisted with the OEPA recommendation in their October 1995 letter (see Appendix A).

The constituents of concern in this closure are AN, EB, MC and ST. The extent of constituents in the shallow soil is limited primarily to the Process Sewer Line area (see Section 2.3.2, Table 6 and Figure 6) at a depth between 5 to 11 feet bgs. Since portions of the Process Sewer Line are scheduled for removal, excavation will take place from the surface to a depth of 12 feet and a width of 4 feet. The estimated excavation north of the Former Drum

Storage Area and to Manhole No. 3 is: 100 ft long x 4 ft wide up to 12 ft deep, or 180 cubic yards (cy) of excavated soil.

Additional selected excavation may be done because of the following:

- Visual observation of stained soil;
- Exceedance of the cleanup criteria; and
- Discretionary excavation pursuant to good engineering practice.

3.0 Statement of Work

3.1 Objectives of the Closure

3.1.1 Objectives for Environmental Media, Constituents and Exposure Pathways

The overall objective of the closure activities is to attain a risk-based closure that meets the cleanup criteria that are based on the Ohio EPA Closure Plan Review Guidance for RCRA Facilities Interim Final, September 1, 1993.

The affected media is:

- Soil with constituents concentrations north of the Former Drum Storage Area along the Process Sewer Line.

No groundwaters are affected or will be affected as discussed in Section 2.3.2 since no groundwater was encountered to a depth of 24 ft bgs and no constituents concentrations were detected at this depth.

Constituents of concern are:

- Methylene chloride (MC);
- Ethylbenzene (EB);
- Acrylonitrile (AN); and
- Styrene (ST).

Potential exposure pathways:

- Groundwater – none as explained above and in Section 2.3.2; and
- Soil –none, if soil is not disturbed because of the low concentrations of constituents in soil in the first few feet bgs, and the inability of humans to ingest or inhale soils containing higher levels of constituents that occur at a depth of 7 to 11 feet bgs.

However, for the purpose of this closure, the ingestion and inhalation exposure pathways are assumed for on-site workers, and the ingestion pathway is assumed for residents. Following the U.S. EPA risk assessment methodology, the inhalation pathway is not considered for the residents.

3.1.2 Proposed Cleanup Criteria for the Constituents of Concern

Table 7 includes risk-based industrial and residential soil cleanup levels for the proposed closure. They are identical to the soil cleanup levels used for the Former Drum Storage Area that were derived based on the Ohio EPA Closure Plan Review Guidance for RCRA Facilities and soil saturation values from the U.S. EPA Soil Screening Guidance: Technical Background Document (OPA/540/R-95/128, May 1996), with the lower of the two included in this Table. Appendix D includes details of the methodology and assumptions used to develop these cleanup levels. The proposed segment of the Process Sewer Line closure activities will be performed pursuant to the lowest cleanup levels listed in Table 7. It is understood that industrial land use closure will result in deed restrictions and a survey for this area. However, if results of the confirmatory soil sampling and analysis will reveal that the residential cleanup levels were achieved, the area closure will be certified pursuant to the residential land use closure.

The intent of the closure is to excavate soil along the Process Sewer Line to concentrations that will meet, at a minimum, the industrial cleanup levels in Table 7. This will be demonstrated by the post-excavation confirmatory soil sampling and analysis. Additional selective excavation will be done following the criteria outlined in Section 2.4.

3.1.3 Areas Subject to the Closure Activities and Estimated Volumes

Figure 10 outlines the areas to be excavated. This includes:

- Portion of the Process Sewer Line north of the Former Drum Storage Area, to Manhole No. 3:
 - Area along the Process Sewer Line: 180 cubic yards (cy), from a 100 ft x 4 ft area to a depth of up to 12 feet.
 - Areas of selective excavation: estimated to be 10 to 20 cy based on visual observations of stained soil, exceedance of the soil cleanup criteria and discretionary excavation pursuant to good engineering practices.

The estimated total volume of soil to be excavated is 200 cy. Accounting for a fluff factor of 1.3, the quantity of soil to be disposed of is approximately 260 cy.

3.2 Quality Assurance

This section describes the quality assurance goals for the implementation of the closure activities. The closure activities will be performed in accordance with the procedures outlined in this Work Plan. Specific, quality assurance objectives are:

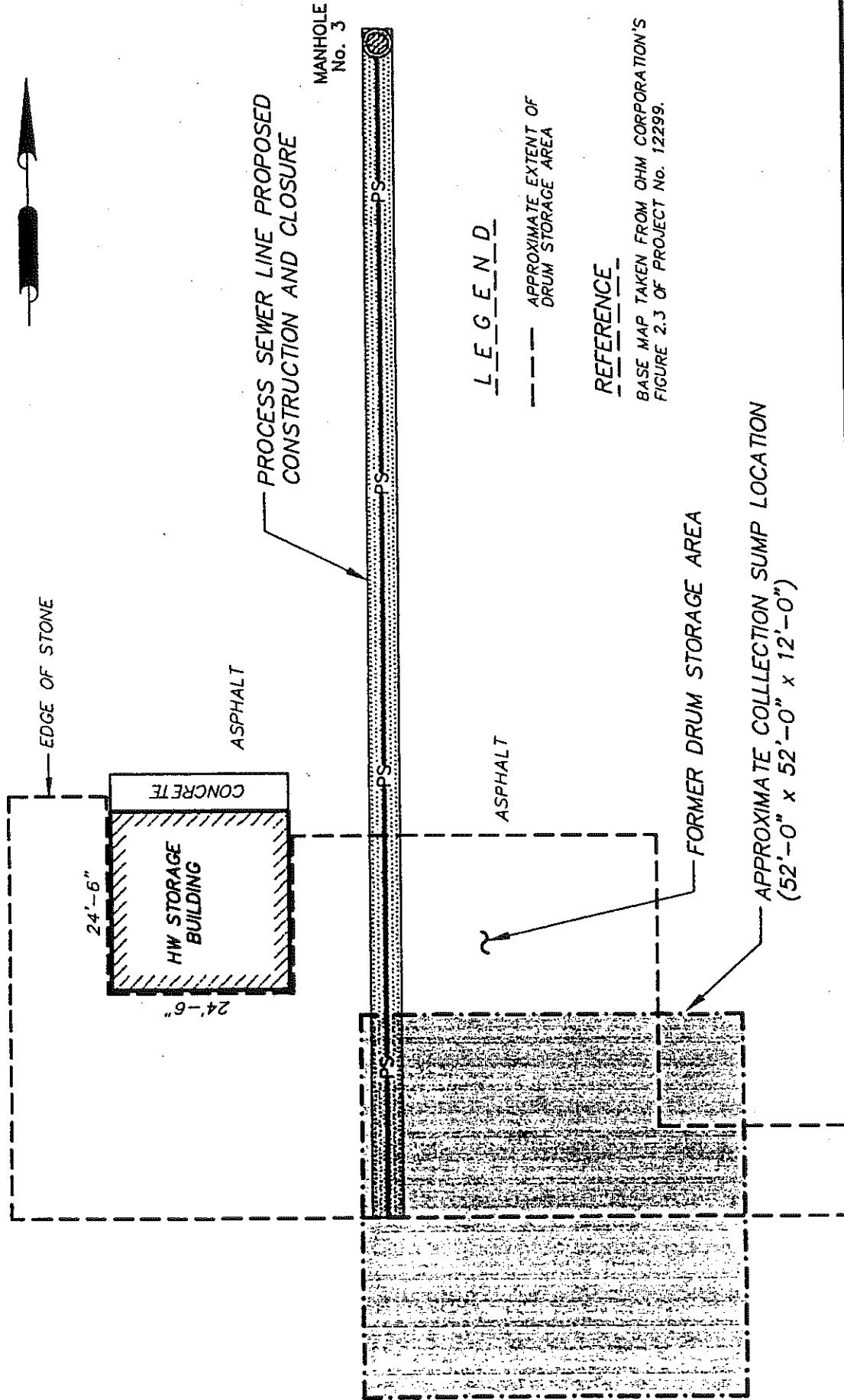
Table 7. Risk-Based Soil Cleanup Levels for the Former Drum Storage Area and a Section of the Process Sewer Line

Dow Hanging Rock Plant

Constituent	Industrial Land Use Cleanup Level (mg/kg)*	Residential Land Use Cleanup Level (mg/kg)**
Acrylonitrile	1.0*	1.2
Ethylbenzene	7,800	7,800
Methylene Chloride	85	85
Styrene	16,000	16,000

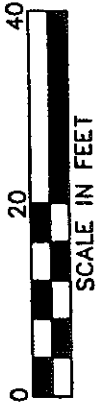
* Derived based on the Ohio EPA Closure Plan Review Guidance for RCRA Facilities.

** Based on soil saturation values from the U.S. EPA Soil Screening Guidance: Technical Background Document.



RADIAN
INTERNATIONAL LLC

COLLECTION SUMP CONSTRUCTION AND CLOSURE OF THE FORMER DRUM STORAGE AREA & THE PROCESS SEWER LINE HANGING ROCK PLANT			
CLIENT:	DOW CHEMICAL COMPANY	JOB NUMBER:	7015-700
SCALE:	AS SHOWN	FIGURE NUMBER	10
		REV	0



- Maintain quality control through standardized procedures, documentation, inspections, and reporting;
- Complete the closure activities and associated activities pursuant to the highest level of workmanship and redo or repair off-specifications or incomplete project tasks; and
- Assure that project equipment and materials meet the specifications as intended by the Work Plan; moreover, reject and replace sub-standard equipment or materials.

Sample handling and field activity documentation procedures for QA/QC are described in Section 4.4.1 of this Work Plan.

4.0 Process Sewer Line Closure Plan

This section provides a discussion of the closure activities for the section of the Process Sewer Line north of the Former Drum Storage Area to manhole No. 3.

4.1 Proposed Closure Activities

The area subject to the closure activities for the Hanging Rock property were outlined in Section 3.1.3. This includes:

- Excavation of soil near and below the sewer line including removal of the line north of the Former Drum Storage Area to Manhole No. 3: 180 cubic yards (cy), from a 100 ft x 4 ft area to up to 12 feet in depth;
- Selective excavation: 10 to 20 cy in several locations along the Process Sewer Line Area.

4.2 Effectiveness of the Closure Activities

As discussed in Sections 3.1.1 through 3.1.3, the proposed closure activities are:

- Meet the risk-based residential soil cleanup criteria that are designed to protect public health and the environment;
- Mitigate high constituents concentrations in soil permanently by the excavation of soil; and
- Meets the intent of RCRA closure requirements.

The closure activities are considered technically and economically effective for the section of the Process Sewer Line north of the Former Drum Storage Area to Manhole No. 3.

4.3 Project Description

This section describes the field activities associated with the closure of the section of the Process Sewer Line north of the Former Drum Storage Area to Manhole No. 3. The closure activities include soil and sewer line excavation, followed by the construction of a 40,000-gallon collection sump to manage the hydraulic loads from the process and unloading areas prior to transfer for treatment at the wastewater treatment plant. This activity will involve approximately 150 feet of the line. This closure plan covers the segment of the Process Sewer Line north of the Former Drum Storage Area and up to Manhole No. 3 (100 ft. long). The closure of the segment of the Process Sewer Line underlying the Former Drum Storage Area is addressed under the Amended Closure Plan for the former Drum Storage Area⁽⁷⁾.

The optimal location for the collection sump, considering existing infrastructure and design engineering factors, is the southeast corner of the Former Drum Storage Area and the area adjacent to it (see Figure 10). This means that only part of the sump will be located on the Former Drum Storage Area.

Sub-sections of the project description section include the following:

- Site mobilization;
- Work zones;
- Closure methods; and,
- Permit requirements/disposal approval.

4.3.1 Site Mobilization

On-site mobilization will take place for the closure activities of both the former Drum Storage Area and the Process Sewer Line. Mobilization will occur after the work plan for closing the Former Drum Storage Area has been approved by The Ohio EPA, and transportation and disposal services have been scheduled. At that time, construction work zone areas and exclusion areas will be established for worker safety and to limit unauthorized personnel from entering the exclusion areas. Equipment to be delivered to the site prior to the initiation of closure activities include:

- Track-mounted CAT 215 LC backhoe or equivalent;
- Roll-offs;
- Pressure washer (1);
- Fifty-five gallon drums for miscellaneous waste disposal;
- Truck liners;
- Soil sampling equipment;
- Personal protective equipment;
- Photoionization Detector (PID);
- Combustible Gas Indicator (CGI); and
- Miscellaneous supplies and expendables.

Additional items to be addressed before the initiation of closure activities include underground utilities, personnel training and medical surveillance.

Drawings showing plant utilities will be reviewed and verified by the plant engineer before closure activities begin. If necessary, utility clearance will be arranged prior to the performance of any work utilizing a local utility locator service.

4.3.2 Work Zones

Areas to be excavated will be marked with high visibility caution tape and be fenced, and support zones will be established to delineate the various areas associated with the closure activities. The specific zones to be established are discussed below.

Exclusion Zone (EZ)—The key exclusion zone (EZ) will be the portion of the Former Drum Storage Area that includes the 50 feet of the Process Sewer Line and the area to the north to Manhole No. 3 that includes the additional 100 feet of the Process Sewer Line shown in Figure 10. This area will be well marked with high visibility safety fencing and will only be entered by authorized individuals outfitted with the appropriate personal protective equipment. Additional exclusion zones will include the southeast corner of the Former Drum Storage Area where a portion of the collection sump will be installed and a few small areas where selective excavation will be performed. They also will be marked with high visibility safety fencing.

Constituent Reduction Zone (CRZ)—The constituent reduction zone (CRZ) will be the area immediately adjacent to the EZ and will be used as the area for protective clothing removal and personnel decontamination as workers exit the EZ. The backhoe will be located within the CRZ. This area will be entered only by authorized personnel involved in remediation activities.

Support Zone (SZ)—The support zone (SZ) will be the area beyond the Former Drum Storage Area CRZ where support personnel and equipment will be staged. Access to the site will be restricted by the main entrance gate. Covered trucks used to transport soil will be staged in the support zone adjacent to the CRZ.

4.3.3 Closure Methods

This section provides a general description of the procedures to be used to excavate soils and the sewer line. In addition, this section outlines the collection sump and connection piping to be installed before area restoration.

Soil Excavation Methods—Soil excavation will be performed by removing the soil with a backhoe from the subject area. Excavation will continue along 100 feet of sewer line to the north to Manhole No. 3 in an approximate width of 4 feet, and a depth of up to 12 feet as

shown on Figure 10. This soil and sewer line excavation will result in approximately 180 cubic yards of soil removed from along and below the Process Sewer Line. Each section of sewer line will be visually inspected before removal to prevent the spillage of free liquids. Free liquids will be pumped and collected in drums for proper treatment in the on-site wastewater treatment plant.

Excavation also will be performed in the Former Drum Storage Area as discussed in the Amended Closure Plan⁽⁷⁾. Selective soil excavation will be performed as explained in Section 3.1.3. Soil samples will be collected from the bottom and walls of the excavated areas to confirm that the cleanup levels in Table 7 have been met (see Section 4.4 and Table 8) for the confirmatory soil sampling and analysis. These samples will be collected after soil field screening has been performed and indicate low constituents concentrations. Connection piping will be installed in the former Process Sewer Line trench and will extend to the north to manhole No. 3. Backfilling and restoration of areas will be performed at the completion of soil excavation and construction of the collection sump, in accordance with procedures outlined in **Backfilling and Restoration**.

Excavation will proceed cautiously so as not to produce unnecessary overburden or disturb the adjacent hazardous waste storage structure or possible underground utilities. The quantity of soil excavated on a daily basis will be determined based on the location of the excavated area, the depth of excavation, the frequency of field screening and confirmatory sampling, and the proximity of the area to underground utilities, subsurface structures and building foundations.

Soil Handling—The soil excavated from the Process Sewer Line Area (200 cy of excavated soil, 260 cy of soil to be disposed off-site [using 1.3 fluff factor]) will be placed in roll-offs and/or onto visqueen and staged in piles adjacent to the excavation in the EZ. Roll-offs and storage piles will be covered and marked with high visibility caution tape until the soils can be loaded into covered trucks and hauled to the disposal facility. Excavated soil from the Process Sewer Line Area will be managed as hazardous waste until characterization sampling is completed.

Upon receipt of soil characterization and disposal facility approval, licensed haulers will be contracted to transport the material in covered trucks for disposal in accordance with applicable state and federal regulations.

Decontamination—Any components of the equipment which are suspected to have come in contact with contaminated soil will be decontaminated prior to leaving the EZ. This will

be accomplished by constructing a portable decontamination pad consisting of polyethylene sheeting and lumber. Initially, all gross contamination will be physically removed by brushing prior to introducing any liquids. A high pressure, low volume water blaster will then be used to thoroughly decontaminate surfaces. The low volume blaster will minimize the decontamination efforts and water requirements associated with these efforts and will keep wastewaters to a minimum.

Water generated by decontamination will be collected and treated at the on-site wastewater treatment plant.

Personnel decontamination will consist of doffing protective clothing as outlined in the Health and Safety Plan and placing it into bags for future disposal with the excavated soils. After all protective clothing has been removed, employees will step into the CRZ and complete decontamination by washing hands and face with mild detergent and water. The liquids generated from this activity will also be disposed of in the same manner used for equipment decontamination.

Backfilling and Restoration—Backfilling operations will occur following the completion of the construction of the collection sump and receipt of confirmatory soil samples results. Collection sump-related construction information is included in the Amended Closure Plan for the Former Drum Storage Area⁽⁷⁾.

Once the collection sump and associated pipeline are installed, backfilling and restoration will be performed.

To perform backfilling operations economically while ensuring that adequate compaction is attained, excavated areas will be backfilled to the extent possible, with soil excavated from portions of the plant site that are not part of the Former Drum Storage Area. Soil will be spread in 8-inch lifts and compacted with the use of either a hydraulic compactor mounted to the backhoe or a hand-operated vibratory compactor, depending on the total area and depth of excavation. Backfill completion will be compatible with the present use of each area, i.e. grass cover, gravel and asphalt. As an example, area where a three-inch layer of asphalt exists with a six-inch subgrade, will be replaced with the same material. The area will be mechanically compacted prior to resurfacing.

4.3.4 Permit Requirements/Disposal Approval

This section describes the project's permit requirements and disposal restrictions that may apply to the excavated soil generated by this closure action.

Permits to Install—A permit to install application for the collection sump will be prepared and submitted to OEPA. The PTI will address the process sewer treatment in the wastewater treatment plant, and the plant NPDES permit. Construction of the collection sump will start after approval has been received from OEPA.

Soil Disposal Restrictions— The Ohio EPA in their October 17, 1996 letter (see Appendix A) have determined that process wastewater released from the Process Sewer Line which leads to a non-hazardous wastewater collection sump was not a listed hazardous waste. This process water could contain traces of styrene, ethylbenzene, and acrylonitrile. According to the Ohio EPA, since the material released to the soil is non-hazardous waste, the contaminated soil in the Process Sewer Line Area is not a listed hazardous waste. Using knowledge of the three constituents of concern, Ohio EPA concluded that the soil does not exhibit a characteristic of hazardous waste. Therefore, the soil may be disposed of into a non-hazardous waste disposal facility.

Dow, however, made a management decision to dispose soil excavated from the segment of the Process Sewer Line underlying the Former Drum Storage Area as hazardous waste. Similarly, Dow decided to dispose portions of the soil excavated from the segment of the Process Sewer Line to the north of the Former Drum Storage Area based on engineering judgement and visual appearance as hazardous waste.

The excavated soil will be sampled and analyzed for waste characterization to ensure compliance with the above the Federal and State Land Disposal Restrictions (LDR). If the soil concentrations and leachate concentrations are not met, the soil will be treated prior to disposal in an approved landfill.

Disposal Destination—Soil transported off-site for disposal will be documented on Form 2, Waste Shipment Log, found in Appendix E. Soils will be transported to an appropriately permitted facility, depending upon the specific characteristics of the waste.

Waste characterization sampling will be required in order to gain disposal facility approval. Samples will be collected during the field activities to characterize the soil prior to its disposal off-site.

4.4 Confirmatory Sampling and Analysis

This section provides a summary of the confirmatory sampling and analysis which is designed to confirm that cleanup levels had been achieved. Table 8 provides information on the number of soil samples, including QA/QC samples, analytical methods, constituents to be analyzed, and turnaround time. A total of 17 confirmatory soil samples, including two QA/QC samples will be collected during the soil excavation activities for the Process Sewer Line.

The number of soil samples is based on a sampling grid interval for the floor and the walls of approximately 20 ft. or less, depending on the size of the area to be excavated.

Confirmatory analysis will include:

- Field headspace analyses of soil to qualitatively assess the soil cleanup level, followed by;
- Off-site laboratory confirmatory analysis of soil to determine whether the cleanup levels were reached.

Headspace grab soil samples will be collected with a clean trowel from the backhoe bucket upon extraction from the excavation, when it is judged that excavation is near completed in the area.

The soil will be placed into a clean 8-ounce (oz) sample jar. Volatilization of constituents from the sampled soil will be minimized by sampling as quickly as possible and by selecting those portions of soil least-disturbed by the backhoe bucket. The sample will be contained as soon as possible and the jar will be sealed immediately after sample deposition. The sample jar will be filled to about one-half of capacity and sealed with aluminum foil and rubber bands. The sample jar will be placed in a warm water bath for about 10 minutes to allow the soil and air inside the jar to reach equilibrium before analysis. After 10 minutes, a field gas chromatograph (Photo ionization Detector [PID]) will be used to analyze the air for methylene chloride. The instrument probe will be carefully inserted through a small opening in the aluminum foil and the

**Table 8. Confirmatory Sampling and Analysis of Soil
Process Sewer Line**

Hanging Rock Plant

Sampling Location	Sampling Grid Size	No. of Soil Samples	No. of QA/QC Samples*	Analysis Method	Turnaround Time
Excavation of 100 feet of the Process Sewer Line Area north of the Former Drum Storage Area to Manhole No. 3 (~180 cy of excavated soil)	20 ft.	15	2	8240 for VOCs including AN, EB, MC, and ST	24 hours

* Two trip blank samples also will be sent for laboratory analysis.

result will be recorded on Headspace Analysis Sample Log (see Form 3 in Appendix F). Operation and calibration of the instrument shall be conducted in accordance with manufacturer's specifications. In addition to standard calibration methods, field blanks (one per day) and duplicates (5 percent of total samples) will be analyzed as part of the quality assurance and quality control program.

The trowel and associated sampling equipment will be decontaminated after the collection of each soil sample.

Confirmatory soil samples will be collected from the floor and walls of the excavation area according to the grid spacing in Table 8. Sampling procedures will be the same as those for headspace analysis. Soil samples will be placed into clean 8-ounce (oz) jars. The jars will be completely filled. Sample quality assurance (QA)/quality control (QC) is provided in Section 4.7.

Confirmatory soil analyses are designed to document that the soil cleanup levels reached those outlined in Table 7. The confirmatory soil analysis will utilize the U.S. EPA SW-846 Method 8240 with Level IV documentation and QA/QC. Turnaround time will be 24 hours to minimize delays of the closure activities.

4.5 Waste Characterization Sampling and Analysis

Samples will be collected from the excavated soil placed in roll-offs and/or visqueen to characterize the soil prior to off-site disposal. The samples will be placed in 8- or 16-ounce sample jars. The jars will be closed and well-taped prior to shipment. Sampling procedures will be similar to those employed for the confirmatory soil sampling. Samples QA/QC is provided in Section 4.7. The number of soil characterization samples will be determined in accordance with the requirements of the disposal facility.

Laboratory analysis will be performed in accordance with the disposal facility requirements and may include toxicity characteristics leaching procedure (TCLP) leachate extract. Soil samples will be analyzed using U.S. EPA SW-846 Methods 8240 (VOCs), 8270 (semivolatiles organic compounds [SVOCs]), and the 6010/7000 series (metals). In addition, the standard test methods for ignitability, corrosivity, reactivity, and toxicity will be performed in accordance with 40 CFR 261.

4.6 Free Liquids Procedure

In addition to the laboratory analyses described above, samples collected from the Former Drum Storage Area excavated soil will be subjected to the paint filter liquids test (SW-846 Method 9095) to determine the presence of free liquids.

4.7 QA/QC and Data Management

4.7.1 QA/QC of Sampling

As a requirement for the sampling effort, a laboratory will be selected that is qualified in performing the analyses described in Sections 4.4, 4.5, 4.6, and is certified by OEPA. The sample analysis report will include the following information: sample analyses results and detection limits, surrogate recoveries, and sample holding times, as well as analysis of blanks and duplicates.

The appropriate numbers of field blanks and duplicates will be collected to support the Quality Control (QC) program as described below. The commercial laboratory will provide laboratory-prepared trip blanks with each sample shipment as well as the internal blanks and spikes described below.

The field and laboratory quality control requirements will include the following:

- Ten percent of field duplicate collection and analysis per matrix;
- One trip blank per matrix per cooler;
- Five percent of matrix spike and matrix spike duplicate sample collection and analysis (per matrix); and
- There are also specified frequencies for laboratory blanks (1/20) and duplicates (1/20) required for the analytical quality control proposed for the investigation.

As described in Section 4.4, field blanks and duplicates will be analyzed as part of the quality assurance and quality control program for the field gas chromatograph.

4.7.2 Field Quality Control and Sample Handling Procedures

The procedures and protocols described in this section will be employed to document sample control and provide data regarding potential impacts of field sampling techniques, sample handling, and the application of the analytical methods on analytical data. These field procedures will be conducted within the framework of the U.S. EPA Contract Laboratory Program (CLP), and in accordance with the U.S. EPA A Compendium of Field Operations Methods (1987).

These procedures and protocols will aid in the evaluation of the precision, accuracy, and representativeness of the chemical analytical results for the samples collected.

4.7.3 Documentation

The forms contained in this section are activity-specific, and shall be considered an integral part of closure plan documentation. Every effort shall be taken to ensure that documentation is true, accurate, and current during the performance of the closure. The forms specified in this section include (see Appendix E):

- Form 1 - Daily Field Log
- Form 2 - Offsite Waste Shipment Log
- Form 3 - Headspace Analysis Sample Log
- Form 4 - Sampling Log
- Form 5 - Chain-of-Custody

4.7.4 Field Sampling Designation

Each field sample will be assigned a unique sample identifier. This identifier will be used throughout the sample collection, analysis, and reporting activities. The sample identifier will be clearly shown on the chain-of-custody form, sample container labels, and will be linked to a sample location. Collected information will be recorded in field sampling log notebooks.

A standard numbering system shall be used to identify each sample taken in order to provide a tracking procedure for retrieval of information. Sample numbers shall be assigned as follows:

- Three-letter project identifier and a dash, e.g., DHR for Dow-Hanging Rock, followed by;
- A soil sample location number and a dash (e.g., SS-01, SS-02, etc.), soil characterization sample location number and a dash (e.g., SC-01, SC-02, etc.) and water characterization sample drum(s) and a dash (e.g., WC-01, WC-02, etc.);
- A two-digit indicator for the depth interval and a dash for soil samples; and
- A six-digit date identifier (to permit quick reference to field logs).

An example of a soil sample identification is as follows:

DHR-SS-25-02-010197

This example represents a soil sample taken from the number twenty-five sampling location at a depth of two feet below ground surface on January 1, 1997.

Prefixes used to identify matrix spike samples, matrix duplicates, and re-analyzed samples will be appended by the laboratory and included in the laboratory deliverables.

4.7.5 Sample Containment and Preservation

To limit chemical or physical changes in a sample during collection and transport, the sample containers will be clean prior to sampling activities and constructed of non-reactive materials.

Glass containers will be used when organic compounds are the analytes of interest. Soil samples will be collected until each container is full to retain anaerobic conditions. Once the sample container is full (and preserved), it will be sealed with a Teflon-lined screw cap. Water samples for VOCs will be collected in 40 ml glass vials with Teflon-lined silicon septum screw caps.

Sample preservation will be employed to ensure sample integrity. The preservation methods will include: pH control, chemical addition, and cooling/refrigeration to a temperature of $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$. These methods will be performed to:

- Retard biological action;
- Retard hydrolysis of chemical compounds and complexes;
- Reduce volatility of constituents; and
- Reduce absorption effects.

Prior to any form of preservation, the following aqueous sample parameters will be measured and recorded :

- pH;
- Specific conductance; and
- Temperature.

These measurements will create a baseline database on the sample and provide sensitivity to the potential for bias in the sample handling procedure.

Once the laboratory receives the samples, laboratory personnel shall analyze them for previously mentioned parameters and produce a report with respect to Level IV data quality objectives (DQOs). Among the method parameters that the laboratory will provide in the final data package(s) are the following:

- Sample tracking documentation;
- Holding time and preservation documentation;
- Gas chromatograph/mass spectrometry (GC/MS) tuning criteria;
- Initial and continuing calibrations;
- System monitoring compound/surrogate spike recoveries for GC/MS analyses;
- Method blank results;
- Laboratory control sample results;
- Matrix spike/matrix spike duplicate results;
- Laboratory duplicates for metals analyses; and
- Internal standard areas and retention times for GC/MS analyses.

4.7.6 Sample Shipping and Chain-of-Custody Procedure

To document the collection of samples, as well as the handling, transport, and receipt of samples at the certified off-site laboratory, a standard Chain-of-Custody (COC) form will be completed. Copies of the signed COC forms will accompany samples to the laboratory and be maintained by Dow. The COC forms will be completed to include the following information:

- Project name, location;
- Field sampling personnel and contact personnel;
- Sample collection information;
 - sample I. D.
 - location
 - time and date of collection
 - type of sample
 - size and number of containers collected
 - analysis to be performed
 - any pertinent comments regarding the sample or samples collection

- Signature of sampler/transporter/receiver;
- Name and shipping reference number; and
- Dates of release/receipt.

Each sample container to be packaged shall be identified by an affixed label that, at a minimum, will detail:

- Site identification number;
- Sample identification date and time of collection;
- Analysis requested; and
- Preservation sampler's initials.

The lid of each sample jar will be tightened securely. Properly identified samples will be placed in resealable plastic bags. The samples will be placed into a sample cooler. Samples will be carefully packed to minimize the potential for breakage or spilling. Noncombustible, absorbent packing material (e.g., vermiculite, newspaper) must be placed between each sample. If necessary, cardboard dividers will also segregate samples from each other.

Ice in watertight resealable plastic bags will be placed around the samples and packing to ensure the samples are preserved to below 4°C until delivery to the laboratory. If shipping by courier, the appropriate COC forms shall accompany the samples in watertight packaging (plastic bags).

After packing, the containers will be sealed in accordance with COC requirements. The outside of the container will be marked "Environmental Sample(s)." If being shipped by courier, a properly completed airbill shall be taped to the outside of the container. Only one airbill is required for multiple containers going to the same destination. Multiple containers going to the same destination will be labeled as "1 of 3," "2 of 3," etc., to eliminate confusion.

5.0 Health and Safety

Health and Safety Plan (HASP) will be prepared for the Process Sewer Line closure. Closure work will be performed in accordance with the HASP. The Site Health and Safety Officer will provide site-specific training and reviews in reference to health and safety and work practice issues and related procedures, as required.

Prior to conducting work, non-Dow project personnel will participate in the Dow Health and Safety orientation for the Hanging Rock plant. This training will include the names of personnel responsible for site safety and health, the actual safety and health hazards identified for this project package, the types of personal protective equipment identified for this work, a discussion of the work practices and engineering controls to be utilized to minimize hazards, and all components of the HASP.

In addition to the training outlined above, each employee will be required to present a copy of their initial 40-hour training certificate, a copy of their most recent 8-hour refresher training certificate, if applicable, and a copy of a medical clearance certificate which is signed by a licensed physician and clears them for work using respiratory protection and work on a hazardous waste project.

6.0 Closure Report

At the completion of the field work, the field operations and field crew will demobilize and leave the facility area. Project personnel will then prepare the closure report.

The Process Sewer Line closure report for the closure activities will include:

- Facility description;
- A description of procedures and conclusion of investigations to characterize the nature and extent of constituents in soil;
- Estimated volume and level of cleanup;
- Cleanup criteria;
- A description of the closure activities performed including transportation and disposal activities and records; and
- Results of confirmatory sampling and analysis.

A copy of the closure report will be provided to OEPA and another copy will be kept at the plant.

7.0 Schedule

The following calendar-day schedule will be implemented for closure activities and construction of the collection sump. Dow's desire is to initiate these activities early in September and complete them by early December to avoid winter issues. The schedule of activities is:

Day 0	The approval of the amended Closure Plan (for the former Drum Storage Area) is received from OEPA.
Day 1	Notify OEPA that closure activities will be initiated within 30 days.
Day 7	Mobilization to the site (within 7 days of notification).
Days 7 to 37	Excavation, confirmatory sampling and analysis*, disposal of wastes off-site (30 days).
Days 37 to 97	Construction of the collection sump and connecting piping and area restoration (60 days).**
Days 67 to 97	Preparation of final report and closure certification*** (30 days).
Day 100	Final report submittal to OEPA.

* The OEPA southeast district office will be notified 5 days prior to initiation of closure soil sampling activities.

** This estimated time may change based on weather conditions.

*** Independent certified engineer will certify the closure.

8.0 References

1. U.S. EPA Region V, *Preliminary Review/Visual Site Inspection Report*, Dow Chemical U.S.A., Hanging Rock Plant, Ironton, Ohio, EPA ID No. OHD039128913, March 1989.
2. OHM Remediation Services Corp., *Closure Plan for the Old Drum Storage Area at the Dow Chemical Hanging Rock Plant in Ironton, Ohio*, May 31, 1991.
3. OHM Remediation Services Corp., *Amended RCRA Closure Plan, Phase III Soil and Soil Gas Sampling and Analysis for the RCRA Closure of Dow's Old Drum Storage Area*, Ironton, Ohio, February 19, 1993.
4. OHM Remediation Services Corp., *Preliminary Report for the RCRA Closure Activities Performed at the RCRA Old Drum Storage Area of Dow Chemical's USA Ironton, Ohio Facility*, August 10, 1993.
5. AWD, *Closure Plan Modifications, Old Drum Storage Area*, Hanging Rock Plant, Ironton, Ohio, prepared for the Dow Chemical Company, September 1993.
6. AWD, *Draft Revisions Closure Plan Modifications, Old Drum Storage Area*, Hanging Plant, Ironton, Ohio, prepared for the Dow Chemical Company, August 29, 1994.
7. Radian International LLC, *Amended Closure Plan for the former Drum Storage Area, Hanging Rock Plant, Ironton, Ohio*, prepared for the Dow Chemical Company, July 1996.

APPENDIX A

OHIO EPA CORRESPONDENCE



State of Ohio Environmental Protection Agency

Southeast District Office

2198 Front Street
Logan, Ohio 43138-8031
(614) 385-8501
FAX (614) 385-8490

George V. Veinovich
Governor

May 4, 1993

RE: LAWRENCE COUNTY
DOW CHEMICAL
RCRA/LQG-TSD
OHD039128912
04-44-0022

Dow Chemical Company
Hanging Rock Plant
Gilruth Lane
Ironton, Ohio 45638

Attn: Ms. Katherine Anderson

Dear Ms. Anderson:

On April 19, 1993, I met with you to discuss the status of the closure of the 'old drum storage area' unit at your facility. The closure plan for this unit was approved by the Director on November 4, 1991, with one time extension allowed by this office. Implementation of the plan has discovered contaminated soil at depth in a portion of the unit. A preliminary Phase 3 workplan was submitted to this office for initial review on March 2, 1993, involving the use of soil gas sampling and headspace analysis to determine the extent of contamination.

We discussed the results of the soil gas study at our meeting. The soil type at your facility was not porous enough to draw a soil gas sample, so soil samples were taken and headspace readings were made per the plan. Results were then confirmed by laboratory analysis. A plume in the unsaturated zone is apparent at depth in an area where a wastewater pipe runs toward the treatment plant. At the time of our meeting, you were unsure if the contamination resulted from minor releases from the pipe, or whether the backfill around the pipe was acting as a conduit for contamination from the drum storage unit. As we discussed, Ohio EPA must assume the contamination to be from the storage area unless Dow can demonstrate otherwise.

You have agreed to amend your approved closure plan to add the soil gas/headspace work already performed. The plan will also need to be amended to investigate the extent of the contamination out through the asphalt roadway, and in two sampling points the total depth of contamination. A demonstration from Dow about other possible sources of this plume would also be appropriate at the time the amended plan is submitted. Should Dow be unable to demonstrate the source is not the drum storage area, Ohio EPA



Dow Chemical
May 4, 1993
Page 2

must assume contamination originated from this unit. Dow is also considering amending the plan to include a risk-based closure performance standard.

A new schedule of implementation will also be necessary. Although Dow was slow to begin implementation of the initial plan, you have been most cooperative in striving for resolution of this closure. It was Ohio EPA's recommendation that amendment of the closure plan occur only once for the soil gas/headspace work and evaluation of any new alternate remedial measures once results were received from the extent of contamination study. Within thirty days from the date of this letter, please provide this office with correspondence to indicate the approximate timeframes for submitting an amended closure plan and schedule. Please indicate at that time which of the closure alternatives we discussed that you plan to pursue.

If you have any questions, or if I may be of further assistance, please feel free to call me at this office.

Sincerely,



Michael Moschell
Inspector
Division of Hazardous Waste Management

MM/jg

cc: Randy Meyer - DHWM, CO



State of Ohio Environmental Protection Agency

Southeast District Office

2196 Front Street
Logan, Ohio 43138-6081
(614) 385-8501
FAX (614) 385-8480

George V. Voinovich
Governor

August 25, 1993

RE: LAWRENCE COUNTY
DOW CHEMICAL
RCRA - LQG, TSD
OHD039128912
04-44-0022

Dow Chemical Company
Hanging Rock Plant
ATTN: Ms. Kathy Anderson
Gilruth Lane
Ironton, Ohio 45638

Dear Ms. Anderson:

On August 6, 1993, this office received your letter and the report from AND Technologies regarding the industrial sewer investigation performed in the area of the old drum storage area. This area is presently undergoing closure pursuant to an approved hazardous waste closure plan. In the course of sampling the soils in the area, Dow discovered contaminated soils at depth and began to investigate the potential cause as being a leak from the process sewer line which runs under this area.

AND's findings conclude that the source of the ethylbenzene, styrene, and acrylonitrile contaminants in the soil samples resulted from leaks in the process sewer. Dow has concurred with the findings of this study and has requested Ohio EPA's concurrence before proceeding with submitting a closure plan modification to address this issue.

Based upon the information received and Dow's concurrence with the findings of this study, this office finds the conclusions reached to be reasonable and recommends Dow submit a closure plan modification to the Director of Ohio EPA pursuant to Ohio Administrative Code 3745-66-12. The submittal must include the findings of the study and describe Dow's new course of action based upon these findings. This office will then review the modification and advise Dow of either our approval or concerns about the proposal.

Please submit the modification to the Director, with a courtesy copy to this office as soon as possible, but at least within thirty days. If there are any questions or you encounter further problems, please call me at this office.

Sincerely,

Michael Moschell
Michael Moschell

Inspector
Division of Hazardous Waste Management

MM/mr

CC: Randy Meyer - DHWM, CO



State of Ohio Environmental Protection Agency

Southeast District Office

2195 Frank Street
 Logan, Ohio 43138-0037
 (614) 395-8801
 FAX (614) 395-8400

George V. Voinovich
 Governor

October 16, 1995

RE: LAWRENCE COUNTY
 DOW CHEMICAL CO.
 RCRA - LQG, ST1
 OHD039128913

Dow Chemical Company
 Hanging Rock Plant
 Gilruth Lane
 Ironton, Ohio 45638

Attn: Mr. Kenan Stevick

Dear Sir:

It was a pleasure to meet with you and representatives from Dow Environmental, Inc. at your office on September 20, 1995, to discuss closure and remediation options for the old drum storage area and wastewater pipeline. The meeting resulted from Dow's proposal to utilize soil vapor extraction technology on a pilot basis to remedy the soil contamination at these contiguous units.

At the meeting, Ohio EPA raised the following concerns:

- ♦ the Northern extent of contamination is not adequately defined along the pipeline;
- ♦ the vertical extent of contamination has not been defined;
- ♦ Dow has not determined if groundwater contamination has resulted from the pipeline's contaminant release;
- ♦ the depth and flow direction of groundwater is not known at this unit, but is generally known for the area;
- ♦ soils in this area may not be amenable to soil vapor extraction, due to their clay content.

These areas need additional work in order to better design an effective treatment system.

During our discussions, Dow Environmental representatives asked what the agency's minimum requirements would be for remediation. I responded that, at least, Dow must complete closure of the storage pad to RCRA standards: either by clean closure treatment/removal or risk assessment. Since the pipeline release was a corrective action issue, Dow has several options open to them.

Ohio EPA strongly encourages Dow to remedy the pipeline release voluntarily, rather than waiting for the agency to take legal action. Should Dow decide to remedy both units, we discussed several actions needed to better assess the area prior to designing a remedial action:



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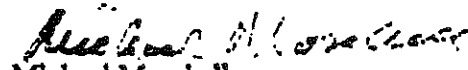
DOW CHEMICAL COMPANY
OCTOBER 16, 1995
PAGE 2

- ♦ take additional soil samples to define the Northern extent of contamination along the pipeline;
- ♦ take soil samples at location 53C to determine the vertical extent of contamination [this location had the highest concentration of contaminants at the greatest depth sampled];
- ♦ ~~should contaminants be found in the soils at the seasonal high water table, groundwater~~ monitoring wells should be installed in sufficient numbers to detect the release and determine the groundwater's depth and direction of flow. Sampling soils to the water table may not be required if contaminants are not detected for three consecutive sampling intervals below the last detection point, when sampling in the vertical plane.

We agreed that within thirty days of the date of this letter, Dow would respond with a letter stating their course of action. That letter would be followed by whatever workplans or revisions were necessary to accomplish the task. Dow would seek Ohio EPA's concurrence on the technical aspects of their proposal. Dow is advised to closely follow any federal or state guidance with regard to corrective action to prevent duplication of effort.

Should you have any questions or need assistance, please call me at this office.

Sincerely,


Michael Moschell
Inspector
Division of Hazardous Waste Management

MM/mr

cc: S. Jane Jacobs - DDAGW, SEDO
cc: Laurie Stevenson - DHWM, CO
cc: Montee Suleiman - DHWM, CO



State of Ohio Environmental Protection Agency

Southeast District Office

2196 Front Street
Logan, Ohio 43138-8031
(614) 386-6801
FAX (614) 386-6480

George V. Voinovich
Governor

May 10, 1996

**RE: LAWRENCE COUNTY
DOW CHEMICAL
RCRA-ST1, LQG
OHD039128913**

Dow Chemical Company
Hanging Rock Plant
Gilruth Lane
Ironton, Ohio 45638

Attn: Mr. Dennis Stanley

Dear Sir:

Your letter of April 23, 1996, concerning the remediation of the old drum storage area and pipeline, has been received and reviewed. Following my discussion with Montee Suleiman, leader of our RCRA Closure Unit in Ohio EPA's Central Office, I can inform you that we concur with the approach you describe. In particular, Dow's most recent sampling efforts have determined the extent of contamination lies above the water table by at least three sampling intervals. Therefore, we agree that the groundwater pathway need not be considered in the risk assessment for the soils in the old drum storage area.

Dow should be advised, however, that all reasonable efforts should be made to remove the contaminated soils from the lower reaches of the excavation below the pipeline. Higher levels of contaminants in this area, as shown by your sampling results, could result in a future release to groundwater. The Toxicity Characteristic Leaching Procedure (TCLP) may be used for samples of the soil in this area as a guideline for determining if additional soil requires removal. Because Dow is voluntarily removing contaminants resulting from this pipeline, conducting a risk assessment on the levels of contaminants remaining in soils in this area is at your option.

Please provide Ohio EPA with an amended closure plan for the old drum storage area as soon as possible. There is currently a statewide backlog of risk assessment plans awaiting review, and we will make an effort to assist you in meeting the timelines your letter describes. Should you have any questions or encounter problems, please call.

Sincerely,

Michael Moschell
Inspector
Division of Hazardous Waste Management

MM/jg

cc: Montee Suleiman - DHWM, CO





State of Ohio Environmental Protection Agency

STREET ADDRESS

1800 WaterMark Drive
Columbus, OH 43215-1099

TELE: (614) 644-3020 FAX: (614) 544-2329

MAILING ADDRESS

P.O. Box 1049
Columbus, OH 43216-1049

CLOSURE PLAN APPROVAL

CERTIFIED MAIL

Re: **CLOSURE PLAN**
Dow Hanging Rock Plant
OHD 039 128 913

September 30, 1996

Mr. Dennis Stanley
The Dow Chemical Company
Hanging Rock Plant
925 County Road 1A
Ironton, Ohio 45638

Dear Mr. Stanley:

On August 9, 1996, the Dow Chemical Company, Hanging Rock Plant, (Dow) submitted to Ohio EPA an amended closure plan for the former drum storage area located at 925 County Road 1A, Ironton, Ohio. An addendum to the amended closure plan was received on September 25, 1996. The amended closure plan was submitted pursuant to Rule(s) 3745-66-12 of the Ohio Administrative Code (OAC) in order to demonstrate that Dow's proposal for closure complies with the requirements of OAC Rules 3745-66-11 and 3745-66-12.

The public was given the opportunity to submit written comments regarding the amended closure plan of Dow in accordance with OAC Rule 3745-66-12. No comments were received by Ohio EPA in this matter.

Based upon review of Dow's submittal and subsequent revisions, I conclude that the amended closure plan for the hazardous waste facility at 925 County Road 1A, Ironton, Ohio, as modified herein, meets the performance standard contained in OAC Rule 3745-66-11 and complies with the pertinent parts of OAC Rule(s) 3745-66-12.

The amended closure plan submitted to Ohio EPA on August 9, 1996 for Dow is hereby approved with the following modification(s):

OHIO E.P.A.

SEP 30 96

ENTERED DIRECTOR'S JOURNAL

I certify this to be a true and accurate copy of the original document as filed in the records of the Ohio Environmental Protection Agency.

By: Kara Yoder

Date 9/30/96

George V. Voinovich, Governor
Nancy P. Hollister, Lt. Governor
Donald R. Schregardus, Director



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1. Section 3.1.2, Page 3-2, Table 7 of the Addendum to the Amended Closure Plan: This table is hereby struck from the closure plan as it does not represent the correct soil clean-up levels established for the site. Dow has provided the correct risk-based soil clean-up levels for both an industrial scenario and a residential scenario in Attachment A of the Addendum to the Amended Closure Plan. These values shall be the established soil clean-up levels.
2. The statement in section 3.1.1 of the regarding potential exposure pathways for soil is hereby struck from the text. The inhalation, ingestion, and dermal pathways for soil have been considered when establishing the risk-based standards. A multi-constituent, multi-pathway, cumulative and additive exposure scenario have been used to establish clean-up standards for both the industrial and residential scenario for the site. Any text that indicates otherwise is hereby struck from the text.

Please be advised that approval of this amended closure plan does not release Dow from any responsibilities as required under the Hazardous and Solid Waste Amendments of 1984 regarding corrective action for all releases of hazardous waste or constituents from any solid waste management unit, regardless of the time at which waste was placed in the unit.

Notwithstanding compliance with the terms of the amended closure plan, the Director may, on the basis of any information that there is or has been a release of hazardous waste, hazardous constituents, or hazardous substances into the environment, issue an order pursuant to Section 3734.20 et seq of the Revised Code or Chapters 3734 or 6111 of the Revised Code requiring corrective action or such other response as deemed necessary; or initiate appropriate action; or seek any appropriate legal or equitable remedies to abate pollution or contamination or to protect public health or safety or the environment.

Nothing here shall waive the right of the Director to take action beyond the terms of the amended closure plan pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. §9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986, Pub. L. 99-499 ("CERCLA") or to take any other action pursuant to applicable Federal or State law, including but not limited to the right to issue a permit with terms and conditions requiring corrective action pursuant to Chapters 3734 or 6111 of the Revised Code; the right to seek injunctive relief, monetary penalties and punitive damages, to undertake any removal, remedial, and/or response action relating to the facility, and to seek recovery for any costs incurred by the Director in undertaking such actions.

Strict compliance with each and every provision of this approved closure plan, especially including the modifications specified herein, is expected. The Ohio EPA will monitor such compliance. The Director expressly reserves the right to take action, pursuant to Chapters 3734 and 6111 of the Revised Code, and other applicable law, to enforce such compliance

I certify this to be a true and accurate copy of the official document as filed in the records of the Ohio Environmental Protection Agency.

By: M. J. Joseph Date: 9/30/96

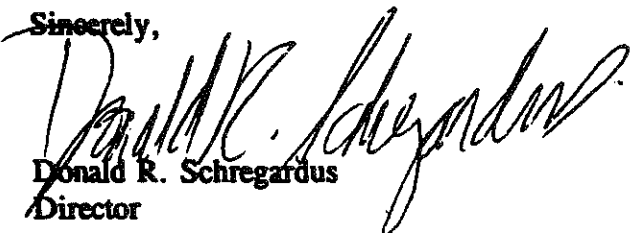
ENTERED DIRECTOR'S JOURNAL
SEP 30 1996

and to seek appropriate remedies in the event of noncompliance with the provisions and modifications of this approved closure plan.

You are notified that this action of the Director is final and may be appealed to the Environmental Board of Review pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. It must be filed with the Environmental Board of Review within thirty (30) days after notice of the Director's action. A copy of the appeal must be served on the Director of the Ohio Environmental Protection Agency within three (3) days of filing with the Board. An appeal may be filed with the Environmental Board of Review at the following address: Environmental Board of Review, 236 East Town Street, Room 300, Columbus, Ohio 43266-0557.

When closure is completed, the Ohio Administrative Code Rule 3745-66-15 requires the owner or operator of a facility to submit to the Director of the Ohio EPA certification by the owner or operator and an independent, registered professional engineer that the facility has been closed in accordance with the approved closure plan. The certification by the owner or operator shall include the statement found in OAC 3745-50-42(D). These certifications should be submitted to: Ohio Environmental Protection Agency, Division of Hazardous Waste Management, Attn: Thomas Crepeau, Data Management Section, P.O. Box 1049, Columbus, Ohio 43216-1049.

Sincerely,


Donald R. Schregardus
Director

dowappSMI.ao

cc: Tom Crepeau, DHWM Central File, Ohio EPA
Montee Suleiman, DHWM, Ohio EPA
Harriet Croke, Ohio Permit Section, USEPA - Region V
Michael Moschell, SEDO, Ohio EPA

I certify this to be a true and accurate copy of the original document as filed in the records of the Ohio Environmental Protection Agency.

By: K. A. [Signature] Date: 9/30/96

OHIO E.P.A.

SEP 30 96

ENTERED DIRECTOR'S JOURNAL



State of Ohio Environmental Protection Agency

Southeast District Office

2195 Front Street
Logan, Ohio 43138-9031
(614) 385-8501
FAX (614) 385-6490

George V. Voinovich
Governor

October 17, 1996

**RE: LAWRENCE COUNTY
DOW CHEMICAL
RCRA - ST1,LQG
OHD039128913**

Dr. Amiram Roffman
Radian International
Penn Central West
III Building, Suite 300
Pittsburgh, PA 15276

by Fax 412-788-1316

Dear Dr. Roffman:

You requested assistance in determining whether soil from a section of a process sewer line at the Dow Chemical Hanging Rock Plant which contains constituents that appear rule 3745-51-33 of the Ohio Administrative Code (OAC) is designated a listed hazardous waste due to the contained-in policy. The constituents of concern are styrene, ethylbenzene, and acrylonitrile. In summary, upon review of the facility RCRA closure plan and information provided during our conference call of October 16, 1996, we have concluded that the contaminated soil in question does not constitute a listed hazardous waste. Furthermore, using knowledge of the constituents of concern, the soil does not appear to exhibit a hazardous waste characteristic. Therefore, the soil may be disposed of at a non-hazardous waste disposal facility.

The information that you provided indicates that the DOW Chemical plant manufactures polymeric beads and foams. Raw materials used in the production of these products include liquid styrene, ethylbenzene, and acrylonitrile. A thorough investigation of the contaminated area in question was performed. Per this investigation, it was determined that an underground process sewer pipe, leading to a non-hazardous wastewater collection sump released process wastewater into the soil. The process wastewater was not a listed hazardous waste.

According to the contained-in policy, soil can only be designated a listed hazardous waste when contaminated by a listed hazardous waste (F or K waste code), an unused or off-specification commercial chemical product that appears in OAC rule 3745-51-33, or a chemical formulation that contains as the sole active ingredient a material that appears in OAC rule 3745-51-33 (P or U waste code). Per the information you provided, the material that contaminated the soil does not fit this criteria. Therefore, the contaminated soil is not a listed hazardous waste.



**DOW CHEMICAL
OCTOBER 17, 1996
PAGE 2**

Per OAC rule 3745-52-11, the generator of a waste is responsible for determining if the material exhibits a characteristic of a hazardous waste as defined in OAC rules 3745-51-21 to 3745-51-24. This determination may be accomplished using process knowledge or analytical methods. Using knowledge of the constituents of concern, it is concluded that the soil does not exhibit a characteristic of a hazardous waste.

Given the above, the soil does not contain a hazardous waste and may be disposed of into a non-hazardous waste disposal facility.

If you have additional questions or if we may be of further assistance, please do not hesitate to contact Mike Moschell at (614) 385-8501 or Karen Hale at (614) 644-2934.

Sincerely,



Mike Moschell
Inspector
Division of Hazardous Waste Management



Karen L. Hale
Technical Support Unit
Division of Hazardous Waste Management, CO

MM/KLH/jg

cc: Dave Chenault, DHWM, SEDO
Jeff Mayhugh, DHWM, CO
Wendy Miller, DHWM, CO



State of Ohio Environmental Protection Agency

STREET ADDRESS:

1800 WaterMark Drive
Columbus, OH 43215-1099

TELE: (614) 644-3020 FAX: (614) 644-2329

MAILING ADDRESS:

P.O. Box 1049
Columbus, OH 43216-1049

April 7, 1997

Completion of Closure
Dow Chemical, Hanging Rock Plant
U.S. EPA ID No.: OHD 039 128 913

Dow Chemical Company, Hanging Rock Plant
Attn: Mr. Dennis Stanley
925 County Road 1A
Ironton, Ohio 45638

Dear Mr. Stanley:

According to Ohio EPA records, on September 30, 1996, the Director of the Ohio EPA approved a closure plan for Dow Chemical, Hanging Rock Plant, 925 County Road 1A, Ironton, Ohio. The plan concerned the Old Drum Storage Area unit at the facility. The Ohio EPA has also received certification documents stating that the unit had been closed according to the specifications in the approved closure plan. Ohio EPA District Office personnel completed a closure inspection and a review of documents pertaining to the drum storage area on March 10, 1997.

Based on this inspection and review, the Ohio EPA has determined that the old hazardous waste drum storage area has been closed in accordance with the approved closure plan and Rules 3745-66-12 through 3745-66-15 of the Ohio Administrative Code (OAC). Moreover, Dow Chemical, Hanging Rock Plant, is no longer a hazardous waste treatment, storage & disposal facility (TSD); however, Dow Chemical, Hanging Rock Plant, remains a large quantity generator (LQG) of hazardous waste.

As specified in OAC Rule 3745-66-40, Dow Chemical, Hanging Rock Plant, will not be required to maintain financial assurance for closure costs and liability coverage for accidental occurrences at this location, in accordance with OAC Rules 3745-66-43(H) and 3745-66-47(E).

- Please note that this letter does not relieve the facility of any corrective action responsibilities that may be required.

If you have any questions concerning the closure process or the current status of the facility, please contact the Ohio EPA, Southeast District Office, Attn: Mike Moschell, 2195 Front Street, Logan, Ohio 43138, tel.: 614-385-8501.

Sincerely yours,

Thomas E. Crepeau, Manager
Data Management Section
Division of Hazardous Waste Management

cc: Mike Moschell, SEDO

Maria Velalis, DMS, DHWM

George V. Voinovich, Governor
Nancy P. Hollister, Lt. Governor
Donald R. Schregardus, Director

APPENDIX B

PROCESS SEWER PIPELINE INVESTIGATION REPORT



*A Subsidiary of
The Dow Chemical Company*

PGH-93-KAM-871

August 4, 1993

Mr. Joe Heil
The Dow Chemical Company
Hanging Rock Plant
Route 52 Box 253
Ironton, Ohio 45638

Subject: Old Drum Storage Area Pipeline Investigation

Dear Joe:

This letter summarizes the findings of AWD Technologies, Inc. (AWD) following the recent pipeline investigation at the Old Drum Storage Area.

The purpose of this investigation was to determine if there is a connection between the subsurface contamination of ethylbenzene (EB), styrene (ST), and acrylonitrile (AN) in the Old Drum Storage area, and the sewer line that bisects this area from north to south. A two-part investigation was performed. The first part of the study focused on the wastewater discharged to the pipeline. The second involved a physical inspection of the line for cracks and joints.

Wastewater Discharge

The wastewater line was installed in 1968 for the purpose of collecting process water from the Styron™/ABS plant and transporting the water to the wastewater treatment plant. Raw materials used in the plant (ST, EB, and AN) would have been present in the process water at various concentrations. Prior to 1980 higher concentrations of these materials were present in the wastewater stream. In fact, it would be normal to find an organic layer present in the wastewater collection pit (at the end of the wastewater line) indicating the presence of these organics in the pipeline. However, since 1980, improved plant operating procedures have decreased the chance of higher concentrations of contaminants being present in the wastewater stream.

PGH-93-KAM-871

Mr. Joe Heil

The Dow Chemical Company

August 4, 1993 - Page 2

Physical Inspection

On July 21, 1993, a television camera inspection of the section of wastewater pipeline that lies beneath the Old Drum Storage Area was performed. The work was performed by Robinson Pipe Cleaning Company (Robinson) under contract to AWD.

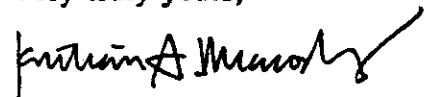
Figure 1 illustrates the section of pipeline that was inspected. The pipeline consists of 10 inch diameter cement sections, each approximately 12.5 feet in length. The line was installed in 1968 and is about 8 feet below grade. Flow is from north to south. The inspection was performed from manhole number 3 to manhole number 2.

The pipeline inspection clearly identified the locations of all pipe joints. These have been plotted with their corresponding distance relative to manhole number 3, on Figure 1. In addition, it was possible to examine the condition of the line. Areas of significant product buildup were noted in several locations. These locations are thought to be areas where organics may have leaked from the wastewater line, accumulated over time, and polymerized to coat the line. Most notably, two areas of significant product buildup were located near two of the highest subsurface headspace sample points (Table 1, 49A and 11A) on Figure 1. It also should be noted that locations of all headspace sample points that showed contamination at 8 feet to 9 feet level and 11 feet and 12 feet (except point 20A) correlated with the location of joints in the wastewater line.

Based on the above findings we conclude that the subsurface contamination of EB, ST, and AN was caused by organics leaking from the wastewater line, not a spill of hazardous waste from the Old Drum Storage Area.

If you have any questions, please do not hesitate to call me at (412) 788-2717.

Very truly yours,



Kristian A. Macoskey

Senior Permitting and Air Quality Specialist

KAM/slk

Enclosures: Figure 1 - Sample Locations & Pipeline Configuration
Table 1 - Summary of Phase III Headspace Soil Data

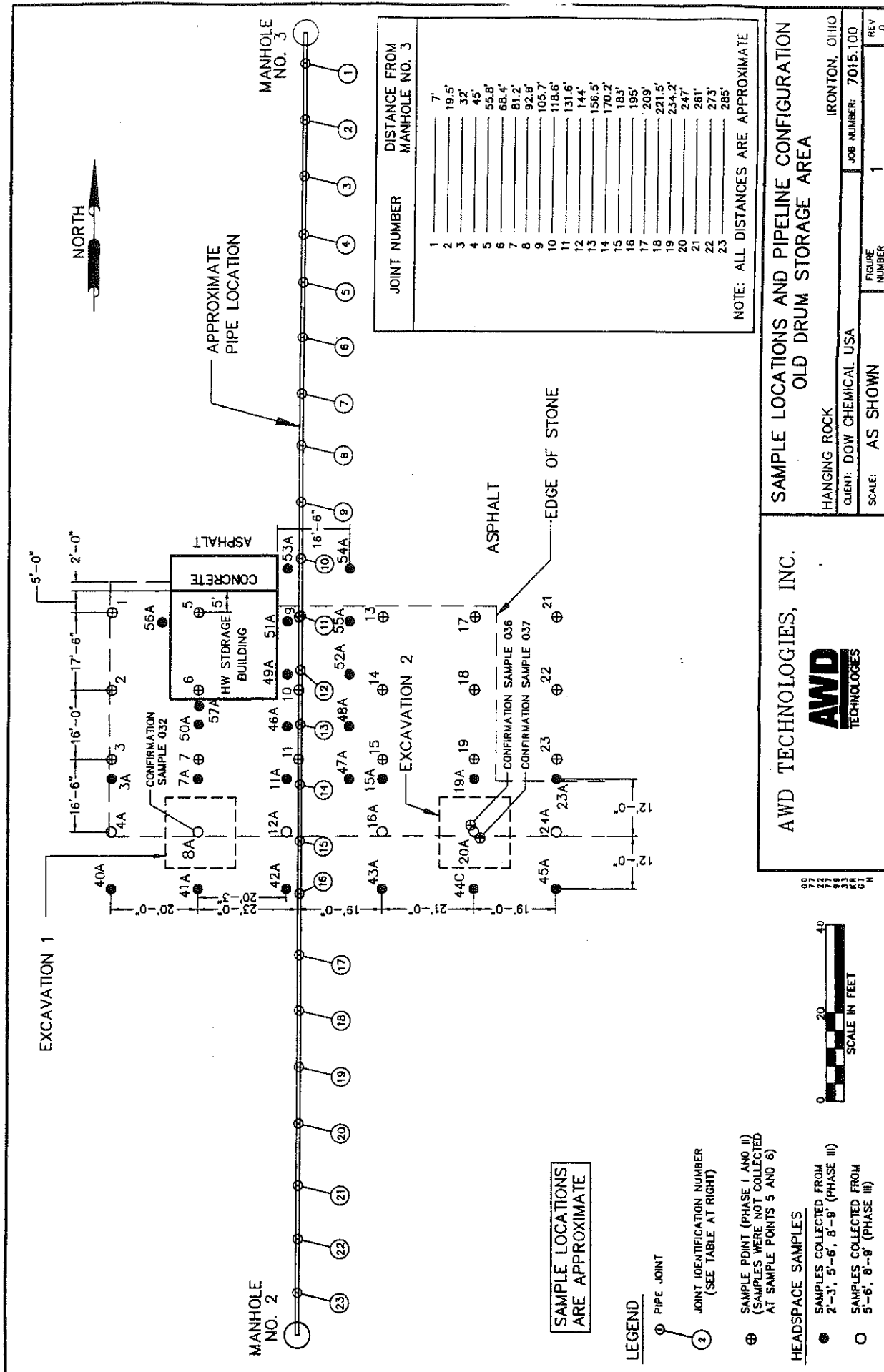


TABLE 1 SUMMARY OF PHASE III HEADSPACE SCL DATA ALONG PIPELINE TRAVERSECT																																	
Depth Below Surface (ft)	Parameter	Headspace Concentration (ppm) at Sample Point																															
		9A	4A	7A	8A	11A	12A	15A	16A	19A	20A	21A	24A	40A	41A	42A	43A	44A	45A	46A	47A	48A	49A	50A	51A	52A	53A	54A	55A	56A	57A		
2 to 5	Ethylbenzene	ND	ND	ND	ND	0.701	ND	ND	0.149	0.016	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.328	ND	0.023	0.159	ND	0.315	0.324	0.36	0.057	0.42	ND	ND	ND	
	Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	Methylcyclohexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.01	ND	0.447	ND	0.254	ND	0.14	ND	ND	ND	
5 to 6	Ethylbenzene	ND	ND	ND	0.531	4.17	ND	ND	ND	ND	1.03	ND	ND	ND	ND	ND	ND	ND	ND	3.58	ND	ND	1.13	ND	1.14	ND	1.76	0.39	ND	ND	ND	ND	ND
	Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	Styrene	ND	ND	ND	ND	0.228	ND	ND	ND	ND	0.47	ND	ND	ND	ND	ND	ND	ND	0.469	ND	ND	0.342	ND	0.331	0.314	0.728	0.135	ND	ND	ND	ND	ND	ND
	Methylcyclohexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.25	ND	0.074	ND	0.774	ND	ND	ND	ND	ND	ND	ND
8 to 9	Ethylbenzene	ND	ND	ND	ND	13.1	ND	ND	ND	ND	0.108	ND	ND	ND	ND	ND	ND	ND	1.40	ND	ND	6.86	ND	2.0	ND	ND	5.79	ND	ND	ND	ND	ND	ND
	Acrylonitrile	ND	ND	ND	ND	4.81	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.91	ND	0.442	ND	0.395	ND	ND	ND	ND	ND	ND	
	Styrene	ND	ND	ND	ND	1.26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.35	ND	0.018	ND	0.585	ND	ND	ND	ND	ND	ND	
	Methylcyclohexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
11 to 12	Ethylbenzene	ND	ND	ND	ND	0.089	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.251	ND	ND	10.0	ND	2.72	ND	4.38	ND	ND	ND	ND	ND	ND	ND
	Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.78	ND	ND	11.9	ND	1.38	ND	11.9	ND	ND	ND	ND	ND	ND	ND
	Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.53	ND	1.38	ND	3.18	ND	ND	ND	ND	ND	ND	ND
	Methylcyclohexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND Denies no sample collected at this depth.

ND Denies Not Detected

APPENDIX C

**AWD, FEBRUARY 1995
AND DEI, MARCH 1996
CLOSURE ACTIVITIES REPORTS**

**PHASE IV SAMPLING REPORT AND
MANAGEMENT PLAN**

FOR

**FORMER DRUM STORAGE AREA
HANGING ROCK PLANT
IRONTON, OHIO**

VOLUME ONE: TEXT

PREPARED FOR

THE DOW CHEMICAL COMPANY

PREPARED BY

**DOW ENVIRONMENTAL INC.
PITTSBURGH, PENNSYLVANIA**

PROJECT NUMBER 7015.500

FEBRUARY 1995

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EXECUTIVE SUMMARY

The Dow Chemical Company (Dow) Hanging Rock plant in Ironton, Ohio has undergone various phases of investigation from 1992 to the present. The investigations have focused on an approximately 50 foot x 100 foot Former Drum Storage Area which contains a less than 90-day RCRA hazardous waste storage building. To-date, four phases of investigation have been conducted, the focus of which have been to better define the extent and concentration of subsurface contamination in this area. In May 1992, a Phase I investigation was conducted to define the horizontal extent of acrylonitrile (AN), ethylbenzene (EB), methylene chloride (MC), and styrene (ST) via surface soil sampling. A Phase II investigation in 1992 involved excavation and confirmation sampling of two 16 foot x 16 foot areas. In February 1993, a Phase III investigation was conducted to further define the vertical and horizontal extent of contamination via headspace sampling at various depths. A pipeline investigation was conducted in July 1993 to demonstrate that the subsurface contamination identified in the earlier phases of work was caused by a source other than the Former Drum Storage Area. This investigation targeted a process sewer line underlying the area.

A Closure Plan Modification, which addressed all phases of work conducted to-date, was submitted to the Ohio Environmental Protection Agency (OEPA) in September 1993. Draft revisions which addressed OEPA's comments to the plan were submitted to the OEPA in August 1994. Upon review of the revised plan, the OEPA requested that the extent of the four previously-identified soil contaminants (AN, EB, MC, and ST) as well as barium be adequately identified. This Phase IV report presents the results of the soil sampling conducted in October 1994 to achieve this objective. The Phase IV investigation determined that elevated concentrations of the four contaminants are present both within as well as to the north of the Former Drum Storage Area.

Due to the fact that this area is adjacent to other known Solid Waste Management Units, including the process sewer line beneath the area, it is recommended that a migration minimization and monitoring program be implemented pending implementation of Corrective Action for the facility as a whole. This will be accomplished through the installation of a geosynthetic clay liner with a geocomposite drainage net. The monitoring program will consist of a limited hydrologic investigation involving the installation of three shallow monitoring wells, and groundwater sampling will be used to monitor the potential for offsite migration of groundwater that may be impacted by the Former Drum Storage Area.

1.0 INTRODUCTION

This report, prepared by Dow Environmental Inc. (DEI), presents the results of Phase IV soil sampling conducted in and around the Former Drum Storage Area at The Dow Chemical Company (Dow) Hanging Rock plant in Ironton, Ohio during October 1994. In addition, this report describes a plan to monitor and reduce migration of contamination present at the Former Drum Storage Area pending implementation of Corrective Action for the facility as a whole.

The Dow Hanging Rock plant is located on a 560-acre site in Hamilton Township in southeastern Lawrence County, Ohio (see Figure 1). The site is bounded by the Ohio River to the south, U.S. Route 52 to the north and east, and the Lawrence-Scioto County line to the west. The Former Drum Storage Area is located in the west central portion of the facility (see Figure 2). The dimensions of the area are approximately 50 feet x 100 feet. The site is relatively flat and consists of vegetated gravel soil. The surrounding areas include an asphalt roadway to the north and east, grassy areas to the west, and a water treatment area to the south. A 25 foot x 25 foot less than 90-day RCRA hazardous waste storage building is present within the Former Drum Storage Area, on its northern perimeter (see Figure 3).

Three phases of field sampling have previously been conducted at this site. Phase I, performed in May 1992, consisted of surface soil sampling at 28 locations to define the horizontal extent of acrylonitrile (AN), ethylbenzene (EB), methylene chloride (MC), and styrene (ST) contamination. Phase II, also performed in 1992, involved excavation and confirmation sampling of two 16 foot by 16 foot areas shown on Figure 3. Phase III was performed in February 1993. During Phase III, headspace sampling was performed throughout the Former Drum Storage Area at various depths to define the vertical and horizontal extent of contamination.

In May 1993, the Ohio Environmental Protection Agency (OEPA) indicated that Dow had agreed to amend the approved Closure Plan to include the February 1993 headspace data (OEPA, 1993a). The OEPA indicated that among other things, Dow could include a demonstration that the subsurface contamination could have been caused by a source other than the Former Drum Storage Area.

A pipeline investigation was subsequently performed on July 21, 1993. The study, which is included as Appendix A of the Closure Plan Modification (AWD, 1993), indicated that there was evidence that the process sewer line underlying the Former Drum Storage Area could be the source of AN, ST, and EB contamination. OEPA accepted Dow's interpretation of the subsurface contamination source on August 25, 1993 (OEPA, 1993b). At that time, OEPA recommended that Dow submit a Closure Plan Modification. The Closure Plan Modification was submitted in September 1993 (AWD, 1993).

Comments on the Closure Plan Modification were received from OEPA, Division of Hazardous Waste Management (DHWM) in August 1994. Draft revisions to the Closure Plan Modification were submitted to the OEPA on August 29, 1994 (AWD, 1994). Following review of the draft revisions, the OEPA requested that the extent of soil contamination of the four previously-identified volatile organics plus barium be adequately defined. This report presents the results of sampling conducted to achieve that objective.

2.0 PHASE IV SAMPLING

2.1 Objectives

The Phase IV soil sampling reported herein was performed at the request of the OEPA DHWM following their review of a proposed Closure Plan Modification (AWD, 1993 and 1994). Specifically, Dow was asked to confirm that the extent of acrylonitrile, ethylbenzene, methylene chloride, and styrene contamination at the Former Drum Storage Area had been adequately defined, both horizontally and vertically. The goal was to demonstrate three points of decreasing soil concentration in the horizontal plane away from the Former Drum Storage Area in all directions. Samples were also to be collected to coincide with former headspace sampling to confirm the vertical extent of contamination. The Phase IV data were to be used to confirm that soil concentrations used in the risk-based component of the Closure Plan Modification were representative of worst-case conditions. In addition, the data would help to define the proposed extent of excavation for the remedial phase of the RCRA closure. Dow was also asked to define the extent of contamination for barium in soil. Samples collected to define volatile organic concentrations were therefore analyzed for barium as well. Samples were collected from an adjacent field and analyzed for barium to define the local background concentration of this naturally-occurring material.

2.2 Methods

2.2.1 Soil Sampling

Soil sampling was performed on October 20, 21, and 22, 1994 according to procedures defined in the Sampling and Analysis Plan attached as Appendix A. A summary of sampling methods, including discrepancies from the Sampling and Analysis Plan, is provided below.

Sample Locations - Barium Background

Twelve soil samples were collected from Dow property south of the investigation area to be analyzed for background barium concentrations. The locations of these samples are shown in Figure 4. This area was determined by a DEI geologist to represent the same soil horizon as material sampled at the Former Drum Storage Area. Three borings were installed (BG-1, BG-2,

and BG-3). From each boring, samples were collected at four depth intervals: 0 to 2 feet, 2 to 4 feet, 4 to 6 feet, and 6 to 8 feet.

Sample Locations - VOC Vertical and Horizontal Extent

Soil sampling was conducted at 35 locations in and around the Former Drum Storage Area. These locations, shown in Figure 5, were defined in an attempt to demonstrate three decreasing soil concentration locations relative to the Former Drum Storage Area. Each location was sampled at one or more depths, as shown in Table 1. Samples were collected from 2-foot depth intervals ranging from the surface to 11 feet, depending on the location. This is a discrepancy from the Sampling and Analysis Plan wherein a 1-foot sample interval was specified. The samples do however represent the depths specified in the Plan. In total, 78 soil samples were collected to define the horizontal and vertical extent of contamination. (This is one more than the 77 samples indicated in Table 1 of the Sampling and Analysis Plan because a sample was collected at 9 to 11 feet at location 53C.) This total does not include 24 soil and 2 liquid samples collected for QA/QC as described in Section 2.2.3.

Soil borings were in some cases offset when subsurface obstructions were encountered or no sample was retrieved. In these cases, the sample location was offset within 1 foot of the originally, intended location. Offset samples are indicated in Table 1.

Sampling Methods

Soil sampling was conducted with the Geoprobe® sampling system. Borings were drilled with a truck-mounted Geoprobe® system to depths indicated in Table 1. An approximately 1.75-inch diameter boring was made with a hydraulic hammer that advanced a threaded push rod to the desired depth. Soil samples were obtained by loosening the drive point of the push rod and inserting a smaller diameter threaded rod through the drilling string. The smaller rod was used to loosen the drive point and the sample was collected by advancing the drill string with the hydraulic hammer. After collection, the drill rod was removed from the borehole. The soil sample contained within the drive point sampler in a clean acetate liner, was pushed out of the outer sampling tube and containerized for shipment to the laboratory.

As indicated above, obstructions were encountered at the surface in a few boring locations (49A, 51A, 53A) adjacent to the Hazardous Waste Storage Building. To conduct sampling in these

locations, an offset boring was started with a drill bit attachment to advance through the cobble-size fill material. Sampling began at the contact between the base of the fill material and at the top of the clay and silt layer. Additionally, in cases when no sample recovery occurred, an offset location was drilled to collect samples from the missed sample depth intervals of the original borehole.

Sample Preparation

Following sample collection, samples were placed in 8-ounce glass jars. The jars were sealed and labeled according to a predetermined numbering system, as described in the Sampling and Analysis Plan. Samples were placed in coolers with ice packs to maintain approximately 4°C throughout shipment to the offsite laboratory.

Equipment Decontamination

Decontamination of sampling equipment was performed at the beginning and end of each sampling event. Sample recovery rods were decontaminated between the collection of individual samples. Trowels used for surface sampling were decontaminated prior to collection of each sample.

The following procedure was used to decontaminate sampling equipment:

- Soil adhering to equipment was brushed off (dry)
- Equipment was rinsed and/or brushed with clean water
- Equipment was washed with detergent
- A potable water rinse was performed
- A deionized water rinse was performed
- The equipment was air dried prior to reuse

Wash water generated in this manner was collected in buckets and transferred to onsite hazardous waste storage containers pending further characterization.

2.2.2 Laboratory Analysis

Field Samples

Sixty-seven samples were analyzed for acrylonitrile, ethylbenzene, methylene chloride, and styrene by U.S. EPA SW-846 Method 8240A (U.S. EPA, 1986). The remaining 11 of 78 total samples collected were not analyzed because data from those locations were not needed to identify three decreasing points of concentration. These 11 samples are identified in Table 1. Samples were also analyzed for barium by U.S. EPA SW-846 Method 6010A (U.S. EPA, 1986). (Note: Use of Method 6010A is a deviation from the Sampling and Analysis Plan [AWD, 1994] that was made because the very low detection limits of Method 7080 were not needed to detect the background soil concentrations found in and around the site.) Samples were also analyzed for percent moisture by U.S. EPA Method 160.3 (modified) (U.S. EPA, 1983). This analysis was needed to allow for reporting of soil concentrations on a dry weight basis, although the analysis was not specified in the approved Sampling and Analysis Plan.

Quality Assurance/Quality Control Samples

Twenty-six samples were analyzed for quality assurance/quality control (QA/QC) purposes, as summarized in Table 2. Fourteen QA/QC samples were analyzed as duplicates. Of these 14, 8 were analyzed for barium (12 percent of the total samples analyzed) and 9 were analyzed for acrylonitrile, ethylbenzene, methylene chloride, and styrene (13 percent of the total samples analyzed). These percentages exceed the 10 percent criteria established for field duplicates in the Sampling and Analysis Plan.

Four matrix spike duplicates and six matrix spikes were analyzed for both barium and the four organics. The specified 5 percent matrix spike and matrix spike duplicate sample analysis was exceeded in both cases. One field blank and one trip blank were analyzed. These blanks were found to be free of the analyzed compounds.

2.2.3 Data Validation

All analysis results for environmental samples were validated according to the U.S. EPA's National Functional Guidelines for Organic Data Review (June, 1991), the U.S. EPA's

Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses (July, 1988), and with reference to method requirements.

The organic analytical data were evaluated by the following QA/QC parameters where applicable: holding times, initial and continuing calibrations, system monitoring compound/surrogate spike recoveries, method blanks, field duplicates, laboratory control samples, matrix spike/matrix spike duplicates (MS/MSDs), analytical sequence, compound identification quantitation, and transcription.

The inorganic analytical data were evaluated by the following QA/QC parameters where applicable: holding times, initial and continuing calibrations, laboratory blanks, ICP interference check samples, ICP serial dilutions, and transcription.

The percent moisture analyses were evaluated by using the QA/QC parameters of laboratory control standard comparisons and duplicate analyses of environmental samples.

2.3 Results

Table 3 summarizes the results of the Phase IV soil sampling. Figures 6, 7, 8, and 9, illustrate detected soil concentrations for volatile organics and barium. The following subsections present the volatile organic and barium data, respectively.

2.3.1 Volatile Organics

Concentrations of individual volatile organic compounds detected in and around the Former Drum Storage Area ranged from nondetect ($< 6 \mu\text{g/kg}$) to 1,400,000 $\mu\text{g/kg}$ (0.14 percent). The following discussions describe VOC data within each of the four analyzed soil depth intervals.

Surface to Three Feet

Detected VOC concentrations from this depth interval, which includes soil samples collected from both the surface to 2-foot interval and the 1-foot to 3-foot interval, are reported together on Figure 6. VOC concentrations at this depth ranged from nondetect to 88 $\mu\text{g/kg}$ (styrene). Ethylbenzene (EB), styrene (ST), and methylene chloride (MC) were detected in these samples although MC was found in only one location. Concentrations near the method detection limit

were detected at locations 20B (7 µg/kg EB), 20C (7 µg/kg MC), and 43B (9 µg/kg EB). EB and ST were detected at locations 53B (76 µg/kg EB and 88 µg/kg ST) and 53C (30 µg/kg EB and 74 µg/kg ST). Ethylbenzene alone was detected near the method detection limits at location 53D (10 µg/kg). As shown in Table 3, EB and ST concentrations reported for location 53C were qualified during data validation as "J", estimated. This indicates that although the analyte is present, the reported value may not be accurate or precise.

Two to Five Feet

Detected VOC concentrations from this depth interval are reported on Figure 7. Ethylbenzene and/or styrene were detected in 9 of 22 samples collected from this depth. EB concentrations ranged from 8 µg/kg to 17,000 µg/kg (51A). Styrene concentrations ranged from 14 µg/kg to 7,600 µg/kg (51A). As for the surface soils, location 53B, 53C, and 53D exhibited elevated concentrations. Additional sample locations along the same north to south transect also exhibited elevated concentrations (i.e., 11A, 46A, 49A, and 51A). Location 8B, near one of the areas excavated during Phase II (1992), also displayed elevated EB concentrations (200 µg/kg). No data in this depth interval were qualified during data validation.

Four to Seven Feet

The highest VOC concentrations detected at the site were found within this soil layer. These data are shown in Figure 8. VOCs were detected at 11 of 19 locations. Detected concentrations ranged from 18 µg/kg MC (location 53D) to over 1,000,000 µg/kg EB (location 53B). Location 53D contained the only detectable concentrations of methylene chloride (18 µg/kg) and acrylonitrile (270 µg/kg) in this soil layer. EB and ST were found in all samples along the north-south transect between points 11A and 53D. Points 11A (570,000 µg/kg EB and 530,000 µg/kg ST) and 53B (1,400,000 µg/kg EB and 950,000 µg/kg ST) displayed the highest concentrations measured on site. Note, however, that EB and ST data at these points were qualified "J" during data validation. This indicates that the analytes are present but the values are estimated. Similarly, detected concentrations at locations 8B, 51B, and 53A are similarly qualified "J." Two analytes that were not detected at location 51A, acrylonitrile and methylene chloride, are qualified as estimated "UJ", as well.

Six to Eleven Feet

VOCs were detected at four of the six locations sampled in this depth interval as shown in Figure 9. Location 20B displayed 27 $\mu\text{g/kg}$ EB and 53 $\mu\text{g/kg}$ ST at a depth of 6 to 8 feet. The other contamination at this depth was found at locations 53B, 53C, and 53D. Location 53B (7 to 9 feet) contained 210,000 $\mu\text{g/kg}$ EB and 81,000 $\mu\text{g/kg}$ ST (both qualified as "J" estimated). Location 53C contained 520,000 $\mu\text{g/kg}$ EB at 7 to 9 feet and 170,000 $\mu\text{g/kg}$ at 9 to 11 feet. ST was detected at this location at 200,000 $\mu\text{g/kg}$ (7 to 9 feet) and 54,000 $\mu\text{g/kg}$ (9 to 11 feet). All four volatile organics were detected at location 53D. The reported concentrations were 870 $\mu\text{g/kg}$ EB, 190 $\mu\text{g/kg}$ AN, 490 $\mu\text{g/kg}$ ST, and 40 $\mu\text{g/kg}$ MC. None of the data from this depth interval was qualified.

Overview of VOC Results

Figures 10 and 11 illustrate the vertical profiles of EB and ST concentrations, respectively, along the north-south transect between sample points 11A and 53D. This alignment coincides well with the subsurface process sewer line that transects the Former Drum Storage Area at approximately 8 feet below grade. It is felt that soil concentrations present in the surface to 3 foot interval cannot be attributed to the process sewer line. As shown in these figures, a distinct subsurface source of EB and ST contamination is indicated at location 53B. Concentrations decrease away from the maxima at a depth of 5 to 7 feet. In addition, a maximum subsurface concentration of EB and ST is indicated at location 11A (4 to 6 feet).

2.3.2 Barium

2.3.2.1 Background Concentrations

Twelve background soil samples were collected and analyzed for barium. The concentrations detected in those samples are summarized in Table 4. These data pass the Kolmogorov-Smirnov test (OEPA, 1993c) for normality at the 95 percent confidence level. However, a natural log transform has been applied to enable comparison to the samples collected onsite. The action level for barium soil concentrations based on OEPA background data, i.e., the upper confidence limit, is 5.265 (ln mg/kg) or 193.4 mg/kg for this site.

2.3.2.2 Onsite Concentrations

The results of 67 soil samples that were analyzed for barium are shown in Table 3. These data as a whole do not pass the Kolmogorov-Smirnov test for normality. Following a natural log transformation, the data do pass the normality test. The transformed data are depicted graphically in Figure 12. As shown, one sample exceeds the background action level of 5.265 ln mg/kg (193.4 mg/kg). This sample, 53C at 5 to 7 feet, is reported as 5.74 ln mg/kg (313 mg/kg).

3.0 MANAGEMENT OPTIONS

3.1 Clean Closure

The Closure Plan Modification currently under review calls for excavation of contaminated soils at the Former Drum Storage Area. That plan proposes clean closure of the Former Drum Storage Area that adjoins Solid Waste Management Units (SWMUs). These SWMUs, most importantly the process sewer system, were identified by A.T. Kearney, Inc. and DPRA Inc. under contract to U.S. EPA Region V in 1989 (Kearney and DPRA, 1989).

The Phase IV sampling results discussed above confirm the presence of the process sewer line SWMU beneath and north of the Former Drum Storage Area. Given the location of the Ohio River to the south and topographic relief to the north, it is likely that groundwater flow is from north to south. This places the Former Drum Storage Area downgradient of the Process Sewer Line SWMU and the bulk of the manufacturing areas of the facility. As a result, DEI feels that there is the potential for the Former Drum Storage Area to become recontaminated if it were clean closed.

At this time, it is felt that clean closure of the Former Drum Storage Area is not possible due to the impact of the other SWMUs onsite. Therefore, DEI proposes that a migration minimization and monitoring program be implemented. Closure will then be based on the implementation of the migration minimization and monitoring program, which is described below.

DEI believes that this approach will protect human health and the environment to the same extent that the removal of contaminated soils would. The primary route of potential human exposure to soil contaminants will be via groundwater. This is because the current and future land use of the site is industrial. There is no possibility that onsite residential exposure scenarios would be realistic for the Former Drum Storage Area. The potential does exist, however, for leaching of site contaminants to groundwater and subsequent transport to the Ohio River or other offsite receptors. Therefore, DEI proposes that future infiltration of water into the Former Drum Storage Area be prevented and that groundwater be monitored downgradient of the Former Drum Storage Area to assess the potential for exposure via the groundwater pathway. At some

future date, Corrective Action will address the facility as a whole, including the Former Drum Storage Area as well as other SWMUs present at the site.

It is DEI's understanding that precedents exist in the state of Ohio for deferring closure of a RCRA area that adjoins known SWMUs. Mr. Dave Sholtes, Assistant Chief of the OEPA OHWM has stated that Wright Patterson Air Force Base and the Fernald Facility both contain small storage facilities located among larger SWMUs (Porter, Wright, Morris, & Arthur, 1995). Remediation of these small areas has not been required by OEPA. So long as the delay in final closure of the storage area does not endanger human health or the environment and is not being requested merely to postpone the remediation, the OEPA sees no reason to insist on immediate clean closure.

3.2 Migration Minimization

As discussed above, the primary pathway for offsite exposure to Former Drum Storage Area contaminants is through leaching of contaminants to groundwater. As such, the highest priority should be placed on preventing the infiltration of rainwater and surface runoff into this area.

Three alternatives for covering the site are presented below. The alternatives are listed in order of most efficient to least efficient in minimizing rainfall percolation.

3.2.1 Alternative 1: High Density Polyethylene (HDPE) Cover

Alternative 1 is an exposed HDPE membrane placed on a graded subbase over the storage area. A liner such as 20 mil Permalon, or similar material, would be used. This material is essentially impermeable when used in this application.

This alternative includes grading the area and placing a subbase soil to allow for drainage of water off of the liner. Approximately 350 cubic yards of soil would be required to grade the area to drain by creating a high spot in the middle and sloping downward toward the edges.

A small anchor trench would then be dug along the perimeter of the area for drainage purposes. The HDPE liner would be placed in the anchor trench and backfilled with the previously excavated soils. The area should be proofrolled and inspected to make sure no stones or sharp objects are present which would damage the liner. Finally, sand bags would be placed on the

liner to prevent it from blowing away. According to the manufacturer, the Permalon liner is UV resistant, and would be expected to be functional over an 8 year period, assuming surface access was restricted.

Of the alternatives presented, this approach would provide the best protection against rainfall percolation and it is the lowest cost. Disadvantages of this alternative include the potential for weather to affect the liner, the care required during installation and afterward to avoid puncturing the liner, maintenance of sand bags, and its low aesthetic appeal.

3.2.2 Alternative 2: Geosynthetic Clay Liner with Geocomposite Drainage Net

This alternative includes grading the storage area and placing subbase soil to allow for drainage along the geocomposite drainage net. Approximately 350 cubic yards of soil would be placed in order to grade the area to drain by creating a high spot in the middle and sloping downward toward the edges. A geosynthetic clay liner (GCL) (with a typical permeability value of 5×10^{-9} cm/sec) such as Claymax, Bentomat, or Gundseal would then be placed over the subbase area.

A geocomposite drainage net consisting of a geotextile heatbonded to a geonet would be placed over the GCL to facilitate drainage away from the area. Lastly, a 1 foot thick protective cover consisting of a fine aggregate would be placed over the geocomposite drainage net.

The advantages of this approach over the others are its relative ease of installation, the fact that weather will not adversely affect the cover, and its minimal maintenance requirements. This is, however, the most expensive option.

3.2.3 Alternative 3: Clay Soil Fill with Geocomposite Drainage Net

This alternative includes placing and compacting a clay soil fill over the storage area. The clay soil fill would be 24 inches high in the middle and would slope down to a height of 18 inches at the sides. Approximately 550 cubic yards of material would be required for this soil fill. A geocomposite drainage net consisting of geotextile heatbonded to a geonet would be placed over the clay soil fill to facilitate drainage away from the area. Lastly, a 1 foot thick protective cover consisting of fine aggregate would be placed over the geocomposite drainage net. This approach

will have an approximate permeability value range of 1×10^{-5} to 1×10^{-7} cm/sec. It should be noted that this range is dependent upon field compaction requirements.

This alternative would be the easiest to install and would require minimal maintenance. Clay soil will, however, become more permeable with each freeze/thaw cycle. This method would be the least effective against rainfall percolation and most susceptible to freeze/thaw.

3.3 Groundwater Monitoring Program

The Phase IV shallow soil investigation detected localized areas of contamination beneath the Former Drum Storage Area. Specifically, elevated levels of EB and ST were concentrated along the length of the process sewer line buried beneath the assessment area (8 feet below grade). The deepest sample collected during the investigation was in Geoprobe® boring 53C from the 9 to 11-foot depth interval. All of the shallow soil sampling was performed within the unsaturated zone. Increasing moisture however was noted in a few samples that were collected at depths below 7 feet.

Based on the Phase IV soil analytical results, there is a potential that the detected contaminants could potentially migrate downward to the water table surface. To monitor this condition, DEI recommends the installation of shallow monitoring wells for sampling to monitor groundwater conditions downgradient of the Former Drum Storage Area.

Limited hydrogeologic information is available for the Dow Hanging Rock Plant area. A Phase I Preliminary Hydrological Review was completed by Earth Sciences for the Dow site in January, 1988 (Earth Sciences, 1988). This report indicates that the plant is located on a terrace in the Ohio River floodplain. The general site stratigraphy consists of a continuous surface clay and silt layer that extends to approximately 8 to 20 feet below grade. An unconsolidated, coarse sand and gravel deposit with an average thickness of 60 feet occurs beneath the surficial clay and silt cover. Pennsylvanian-age shale bedrock is encountered beneath the sand and gravel layer.

The sand and gravel layer is a principal aquifer for the surrounding area and supplies process water for Dow plant operations. The groundwater table is estimated to be 20 to 25 feet below grade and is believed to flow in a southwesterly direction toward the Ohio River. Recharge to the aquifer is presumed to be from the Ohio River.

Five production wells are installed at the Dow Hanging Rock Plant site. It is speculated that a sixth well may also exist onsite along the east side of Gilruth Lane. The five well locations and the possible sixth well location are shown on Figure 13. Recent communication with Dow Hanging Rock personnel has indicated that one of the plant wells (Dow-1) has been sealed and abandoned. At this moment, few details are available on the plant wells. The active wells (Dow-2, Dow-3, Dow-4, and Dow-5) are intermittently operated, however the pumping rates, water volumes, and well screen intervals are unknown. The active wells are located south of the Former Drum Storage Area. Under natural gradient conditions, groundwater entering the northeastern portion of the Former Drum Storage Area should flow in a southwesterly direction towards the Dow-5 well location. The groundwater flow regime may be altered during active pumping of the plant wells.

DEI has thoroughly reviewed the available chemical and hydrogeological data for the Former Drum Storage Area. Based on this review DEI recommends that the following steps be undertaken by Dow to assess and monitor groundwater conditions beneath the site area:

- Research plant records for information on physical data and status of the active plant wells.
- Obtain copies of well records containing pumping rates, water volumes, and times of operation.
- Drill and install three shallow monitoring wells for sampling downgradient of the Former Drum Storage Area.
- Perform single-well response tests to estimate hydraulic conductivity values of the sand and gravel aquifer.

The proposed monitoring wells will screen the upper portion of the sand and gravel aquifer between estimated depths of 20 to 30 feet below ground surface. The proposed wells will be strategically located in downgradient areas and are represented on Figure 14. These locations are tentative and are subject to change based on hydrogeologic conditions and other site constraints. Hydraulic characteristics of the sand and gravel aquifer will be ascertained by collecting water level measurements to determine the hydraulic gradient and groundwater flow

direction within the study area. Results from single-well response tests will be used to calculate groundwater flow velocity beneath the site area.

Groundwater sampling will be performed following well installation activities. The groundwater samples will be analyzed for indicator parameters (pH, specific conductance, temperature, TOC, TOX, etc.) and for the four known VOC constituents (EB, ST, MC, AN) that have impacted the overlying soils. Following the initial round of sampling and review of analytical results, a program for periodic monitoring will be developed. This monitoring will be conducted on an annual basis if analytical results from the initial sampling are found to be below U.S. EPA Maximum Contaminant Levels (MCLs) for drinking water. If concentrations exist above the MCLs, then semiannual monitoring will be conducted.

4.0 RECOMMENDATIONS

The Phase IV soil sampling reported herein indicates that elevated concentrations of ethylbenzene and styrene, as well as detectable concentrations of methylene chloride and acrylonitrile are present within and to the north of the Former Drum Storage Area. As discussed in Section 3.0, because the Former Drum Storage Area is adjacent to known SWMUs, including a process sewer line beneath the Area, DEI recommends that the migration minimization and monitoring program discussed above be implemented.

Of the three migration minimization alternatives evaluated, DEI recommends use of Alternative 2, the geosynthetic clay liner with geocomposite drainage net. Although all three alternatives are suitable for this application, Alternative 2 is the least susceptible to weathering, requires minimal maintenance, and will effectively minimize rainfall percolation. Based on these advantages, it is felt that Alternative 2 is the preferred alternative, regardless of the fact that it is the most expensive.

Following installation of the cover, a limited hydrologic investigation is also recommended. As discussed above, this would involve installation of three shallow monitoring wells following review of plant records on the active production wells. The study would include single-well response tests to estimate hydraulic conductivity. Groundwater sampling performed following well installation will be used to monitor the potential for offsite migration of groundwater that may be impacted by the overlying soils of the Former Drum Storage Area.

5.0 SCHEDULE

Following approval of the management plan included herein, installation of the geosynthetic cover and initiation of the groundwater monitoring program would follow the schedule shown below.

Activity	Weeks Following Approval
Cover installation Review of plant well records	Weeks 1 and 2
Install monitoring wells, perform single-well response tests, initiate groundwater monitoring	Weeks 3 and 4

6.0 REFERENCES

AWD Technologies, Inc., 1993. Closure Plan Modification, Old Drum Storage Area, Hanging Rock Plant, Ironton, Ohio, Project Number 7015-500, September.

AWD Technologies, Inc., 1994. Closure Plan Modification, Old Drum Storage Area, Hanging Rock Plant, Ironton, Ohio, Draft Revisions, Project Number 7015-500, August 29.

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Ohio Environmental Protection Agency, 1993a. Letter re: Lawrence Co. Dow Chemical RCRA/LQG-TSD OHD039128912, 04-44-0022 to Ms. Katherine Anderson from Mr. Michael Moschell, Inspector - DHWM, May 4.

Ohio Environmental Protection Agency, 1993b. Letter re: Lawrence Co. Dow Chemical RCRA/LQG-TSD OHD039128912, 04-44-0022 to Ms. Katherine Anderson from Mr. Michael Moschell, Inspector - DHWM, August 25.

Ohio Environmental Protection Agency, 1993c. Closure Plan Review Guidance for RCRA Facilities, Interim Final, September 1.

Porter, Wright, Morris & Arthur, 1995. Letter to Ms. Katherine M. Anderson, The Dow Chemical Company, from Mr. Martin S. Seltzer, January 6.

U.S. Environmental Protection Agency, 1991. National Functional Guidelines for Organic Data Review, Prepared for the Hazardous Site Evaluation Division, U.S. EPA, July, 1988. June.

U.S. Environmental Protection Agency, 1988. Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, Prepared for the Hazardous Site Evaluation Division, U.S. EPA, July 1988.

U.S. Environmental Protection Agency, 1986. Test Methods for Evaluating Solid Waste, Third Edition, Volume 1A: Laboratory Manual Physical/Chemical Methods, Office of Solid Waste and Emergency Response, Washington, D.C., November.

U.S. Environmental Protection Agency, 1983. Methods for Chemical Analysis of Water and Wastes, Environmental Monitoring and Support Laboratory, Office of Research and Development, Cincinnati, Ohio, March.

TABLES

TABLE 1									
SUMMARY OF SOIL SAMPLING LOCATIONS AND DEPTHS ^(a)									
Location ^(b)	Depth Interval (feet below grade)								
	0-2	1-3	2-4	3-5	4-6	5-7	6-8	7-9	9-11
8A					X				
8B	X		X ^(c)		X		O		
8C	X		X		X		O		
8D	X		X		X		O		
11A			X		X				
16A			X						
17B		X							
17C		X							
19A			X						
20A					X				
20B	X		X		X		X		
20C	X		X		X		X		
20D	X		X		X		X		
21B		X							
22B		X							
22C		O							
23B		X							
23C		X							
23D		O							
43B	X								
43C	X								
46A			X		X				
48A			X						
49A			X ^(c)		X				

TABLE 1									
SUMMARY OF SOIL SAMPLING LOCATIONS AND DEPTHS ^(a)									
Location ^(b)	Depth Interval (feet below grade)								
	0-2	1-3	2-4	3-5	4-6	5-7	6-8	7-9	9-11
51A			X ^(c)		X ^(c)				
52A			X						
53A			X						
53B		X		X		X ^(c)		X ^(c)	
53C		X		X		X		X	X
53D		X		X		X		X	
54A			X		X				
54B		X		X		X		O	
54C		X		X		X		O	
54D		O		O		O		O	
55A			X						
BG-1	X		X		X		X		
BG-2	X		X		X		X		
BG-3	X		X		X		X		

^(a) "X" indicates that the sample was collected and analyzed for acrylonitrile, styrene, methylene chloride, ethylbenzene, and barium.

"O" indicates that the sample was collected but analysis was not needed to obtain three decreasing points of concentration.

^(b) Locations are indicated on Figure 5.

^(c) This sample was offset for resampling.

TABLE 2

SUMMARY OF QA/QC SAMPLE ANALYSIS
PAGE 1 OF 2

Location	Depth Interval (ft)	Analysis Method (SW-846) ^(a)	Sample Type			
			Duplicate	Matrix Spike	Matrix Spike Duplicate	Blank
16A	2 - 4	8240A/6010A		X		
19A	2 - 4	8240A	X			
20A	4 - 6	8240A	X			
20A	4 - 6	8240A/6010A		X	X	
20A	4 - 6	6010A	X			
20B	2 - 4	8240A	X			
20C	0 - 2	8240A/6010A	X			
20C	0 - 2	8240A	X			
20C	0 - 2	8240A/6010A		X	X	
20C	2 - 4	8240A/6010A		X		
21B	1 - 3	6010A	X			
22B	1 - 3	6010A	X			
22B	1 - 3	8240A	X			
22B	1 - 3	8240A/6010A		X	X	

TABLE 2

SUMMARY OF QA/QC SAMPLE ANALYSIS
PAGE 2 OF 2

Location	Depth Interval (ft)	Analysis Method (SW-846) ^(a)	Sample Type			
			Duplicate	Matrix Spike	Matrix Spike Duplicate	Blank
23C	1 - 3	8240A/6010A	X			
43B	0 - 2	8240A/6010A	X			
53C	1 - 3	8240A/6010A	X			
54C	1 - 3	8240A	X			
54C	1 - 3	6010A	X			
54C	1 - 3	8240A/6010A		X	X	
Field Blank	NA	8240A				X
Trip Blank	NA	8240A/6010A/3005A				X
Totals:			14	6	4	2

^(a) 8240A: Volatile Organics by Gas Chromatography/Mass Spectrometry

6010A: Inductively Coupled Plasma - Atomic Emission Spectroscopy

3005A: Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by Flame Atomic Absorption (FAA) or Inductively Coupled Plasma (ICP) Spectroscopy

TABLE 3
DOW HANGING ROCK - SUMMARY OF PHASE IV SOIL SAMPLING (10/20/94 - 10/22/94)

D-0117 - BATHING ROCK - SUMMARY OF THIRDEY SOIL SAMPLING (10/20/94 - 10/22/94)																																					
Depth (ft) ^a	Analyte	Dry Weight Concentration (ug/kg) [except for barium (mg/kg)] at Sample Location ^d																																			
		8A	8B	8C	8D	11A	16A	17B	17C	19A	20A	20B	20C	20D	21B	22B	23B	23C	43B	43C	46A	48A	49A	51A	52A	53A	53B	53C	53D	54A	54B	54C	55A	BC-1	BC-2	BC-3	
1	EB		<6	<6	<6							<6	<6																								
	AN		<120	<110	<120							<120	<110							9	<6																
	ST		<6	<6	<6							<6	<6						<110	<110																	
	MC		<6	<6	<6							<6	<6						<6	<6																	
2	Ba		73	137	80														<6	<6															77	87	100
	EB																																				
	AN																																				
	ST																																				
3	MC																																				
	Ba																																				
	EB		200	<6	<6																																
	AN		<120	<120	<120																																
4	ST		<6	<6	<6																																
	MC		<6	<6	<6																																
	Ba		153	124	106																																
	EB																																				
5	AN																																				
	ST																																				
	MC																																				
	Ba																																				
6	EB		<6	<6	<6																																
	AN		<120	<130	<130																																
	ST		<6	<6	<6																																
	MC		<6	<6	<6																																
7	Ba		130	121	105																																
	EB																																				
	AN																																				
	ST																																				
8	MC																																				
	Ba																																				
	EB																																				
	AN																																				
10	ST																																				
	MC																																				
	Ba																																				
	EB																																				

^a Non-detect analytes are reported as the limit of quantitation. "... indicates "not sampled."

^b Midpoint of the 2-foot sample interval - depth below surface.

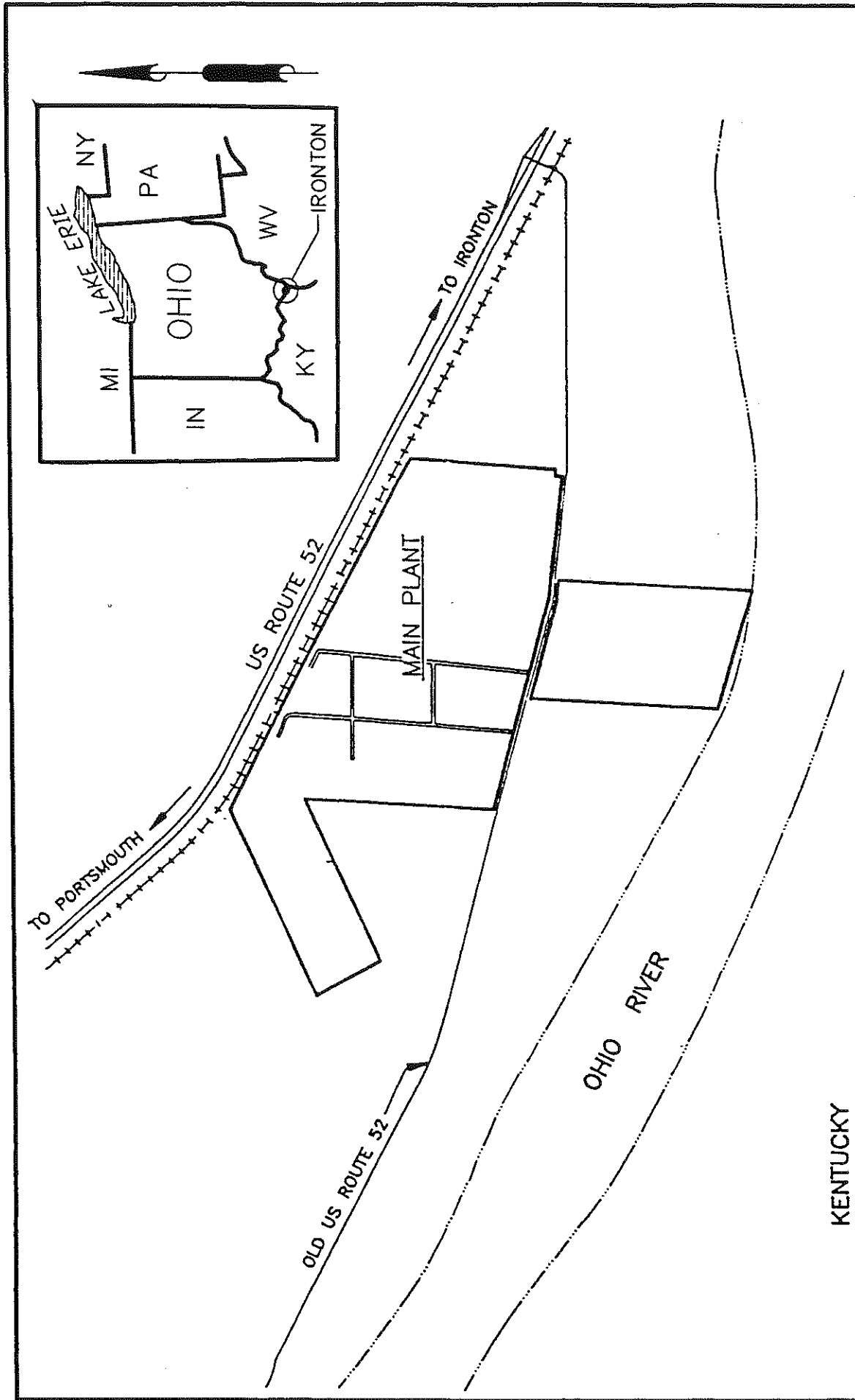
^c "EB" = ethylbenzene, "AN" = acrylonitrile, "ST" = styrene, "MC" = methylene chloride, "Ba" = barium.

^d Data qualified as "J." Analyte is present but concentration is estimated.

^e Data qualified as "UJ" - analyte was not detected, but reported quantitation limit is estimated.

<p align="center">TABLE 4</p> <p align="center">SUMMARY OF BACKGROUND BARIUM CONCENTRATIONS AND DERIVATION OF SITE-SPECIFIC ACTION LEVEL</p>			
Sample No.	Depth Interval (ft)	Barium Concentration	
		(mg/kg)	ln (mg/kg)
BG-1	0 - 2	77	4.3438
BG-1	2 - 4	66	4.1897
BG-1	4 - 6	116	4.7536
BG-1	6 - 8	154	5.037
BG-2	0 - 2	87	4.4659
BG-2	2 - 4	87	4.4659
BG-2	4 - 6	118	4.7707
BG-2	6 - 8	170	5.1358
BG-3	0 - 2	100	4.6052
BG-3	2 - 4	79	4.3694
BG-3	4 - 6	116	4.7536
BG-3	6 - 8	151	5.0173
Mean = 4.6590			
Standard Deviation = 0.3030			
<p>Upper Compliance Level (Action Level) = Mean + 2 (standard deviation)</p> <p>= 4.659 + 2 (0.303)</p> <p>= 5.265 (ln mg/kg)</p> <p>= 193.4 mg/kg</p>			

FIGURES

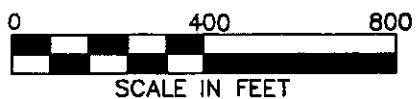
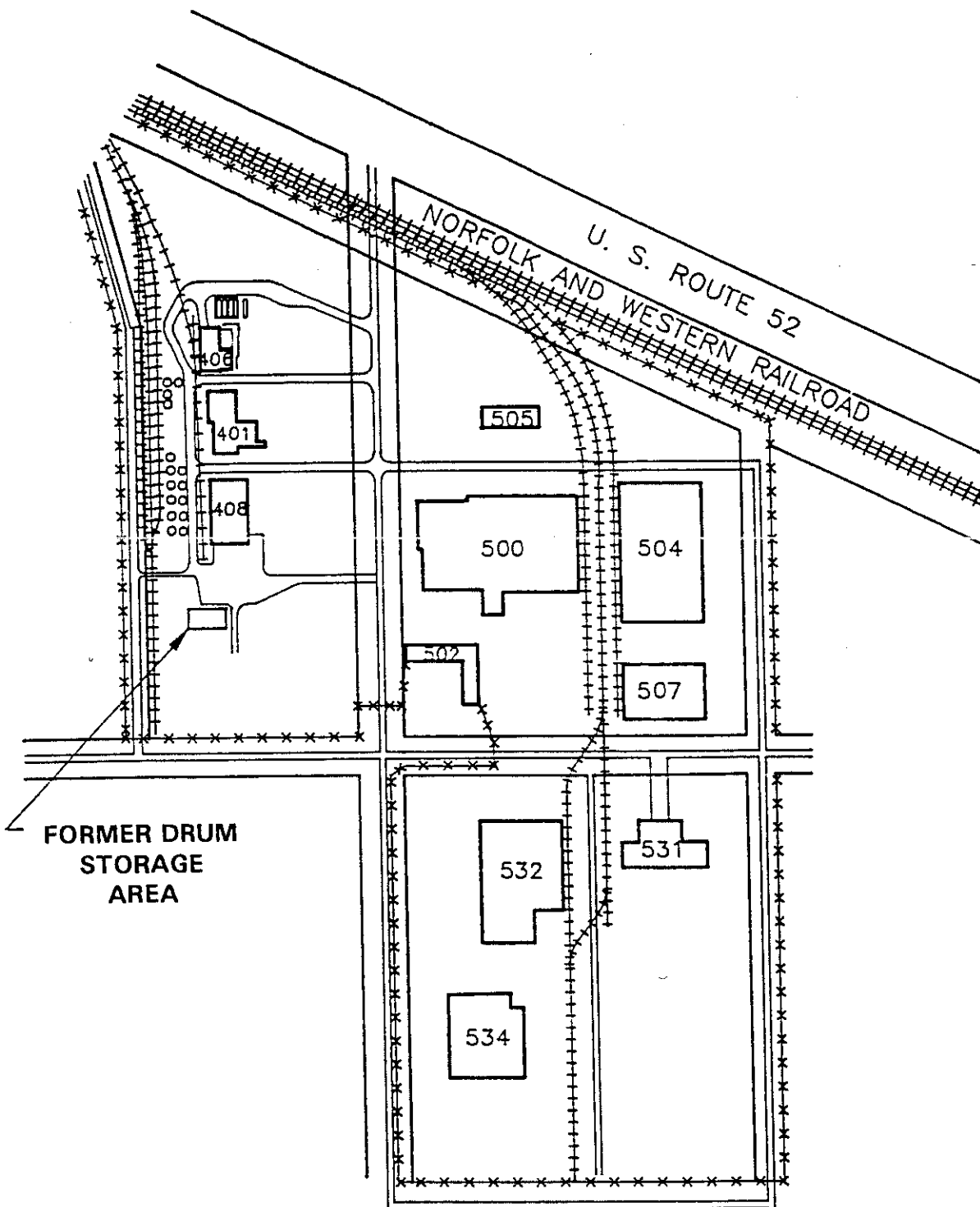


KENTUCKY



SITE LOCATION MAP

HANGING ROCK CLOSURE		IRONTON, OH	
CLIENT: DOW CHEMICAL COMPANY		JOB NUMBER: 7015-500	
SCALE: AS SHOWN	FIGURE NUMBER: 1	REV: 0	



NOTE: ONLY MAIN FEATURES ARE SHOWN ON THIS PLAN.



Dow Environmental

FACILITY PLAN

HANGING ROCK CLOSURE

IRONTON, OH

CLIENT: DOW CHEMICAL COMPANY

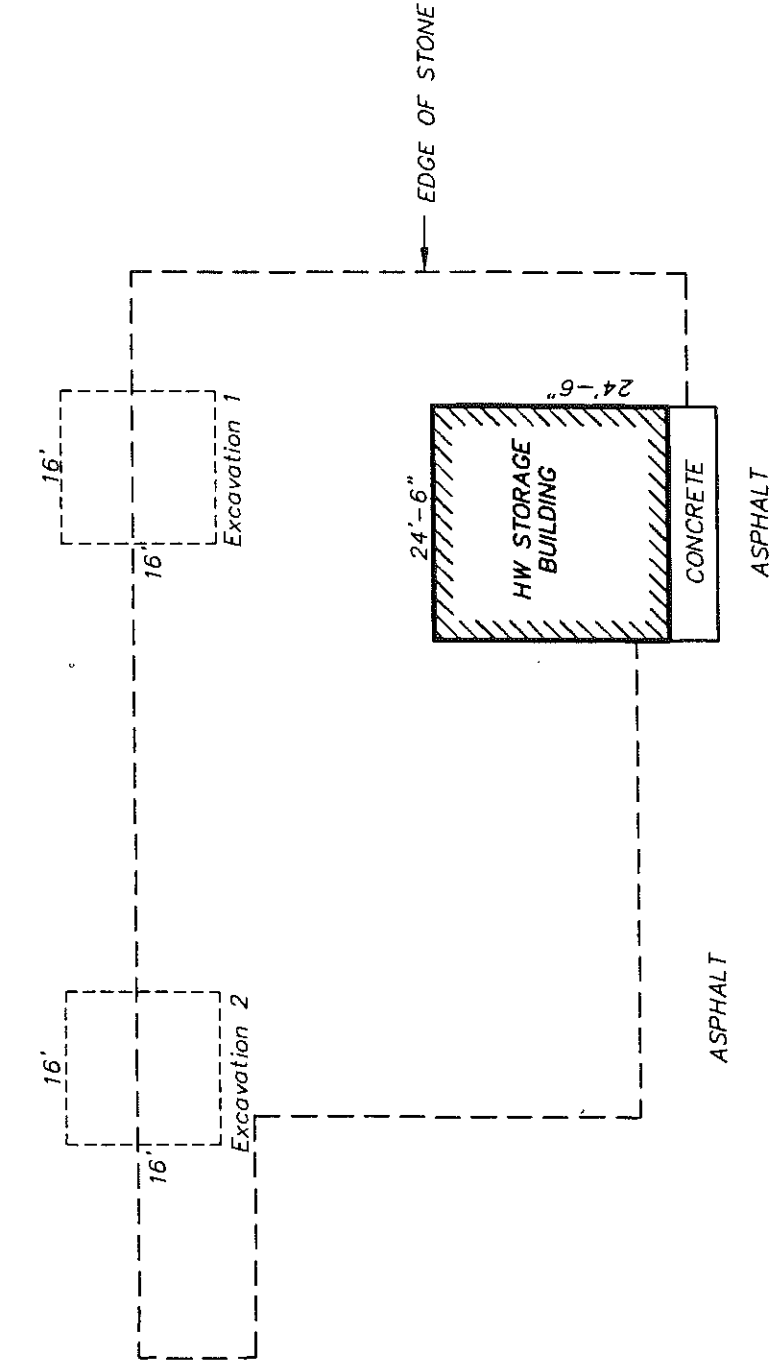
JOB NUMBER: 7015-500

SCALE: AS SHOWN

FIGURE
NUMBER

2

REV
0

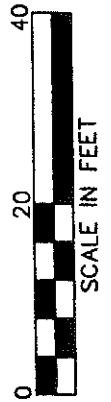


LEGEND

--- APPROXIMATE EXTENT OF DRUM STORAGE AREA

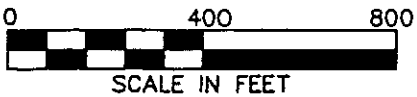
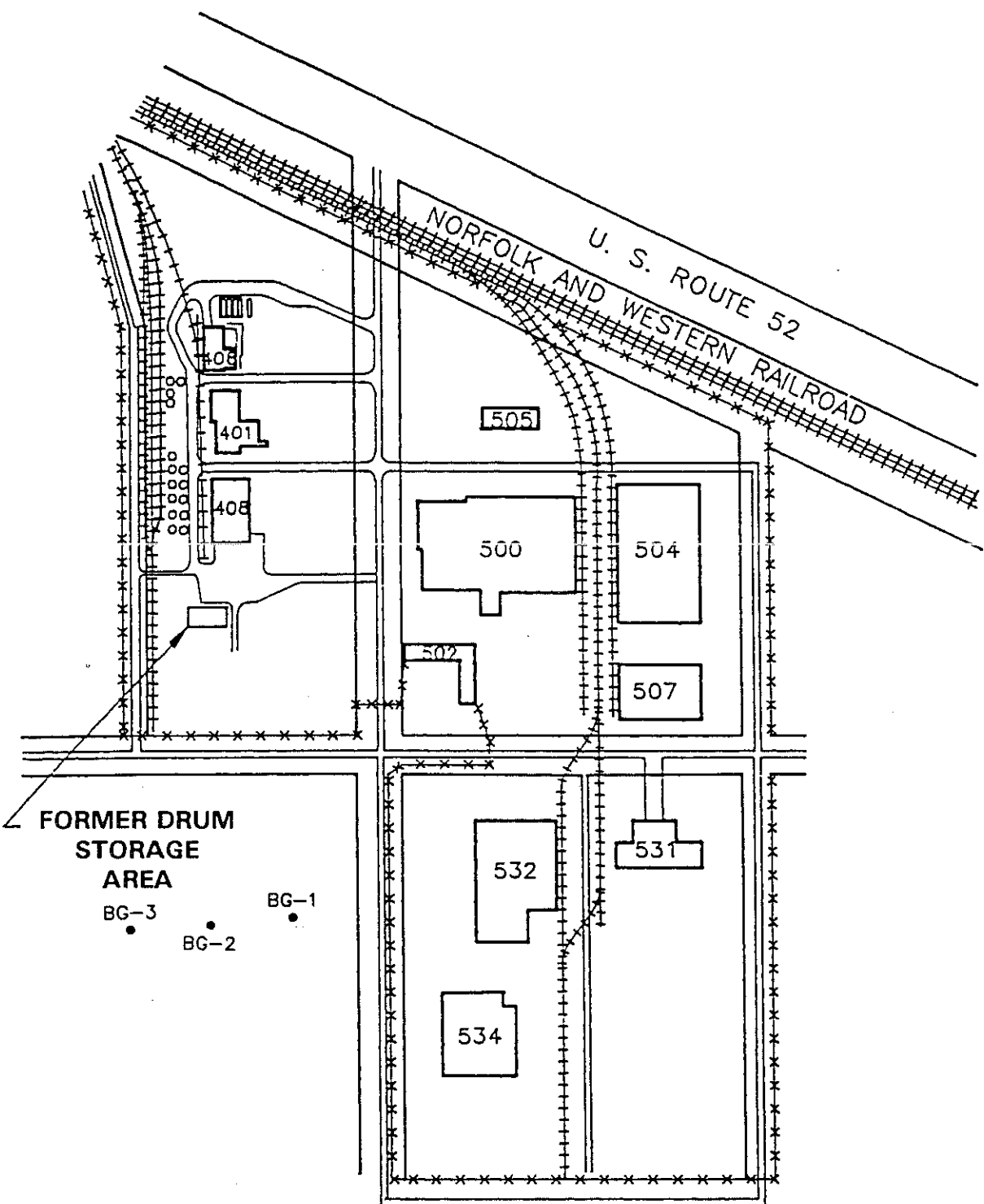
REFERENCE

BASE MAP TAKEN FROM OHM CORPORATION'S
FIGURE 2.3 OF PROJECT No. 12299.



SITE LOCATION

HANGING ROCK CLOSURE	IRONTON, OH
CLIENT: DOW CHEMICAL COMPANY	JOB NUMBER: 7015-500
SCALE: AS SHOWN	FIGURE NUMBER: 3
	REV: 0

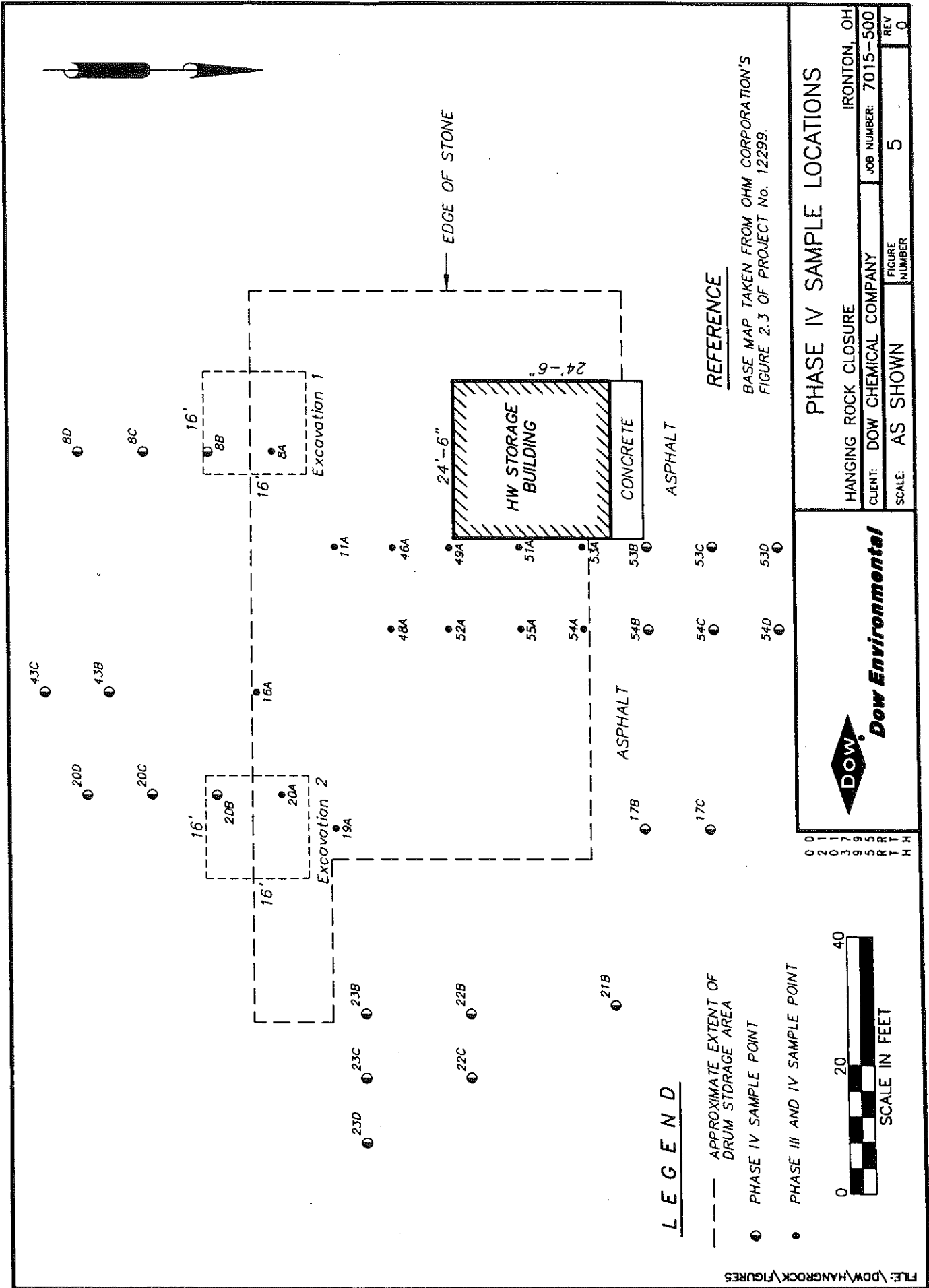


NOTE: ONLY MAIN FEATURES ARE SHOWN ON THIS PLAN.

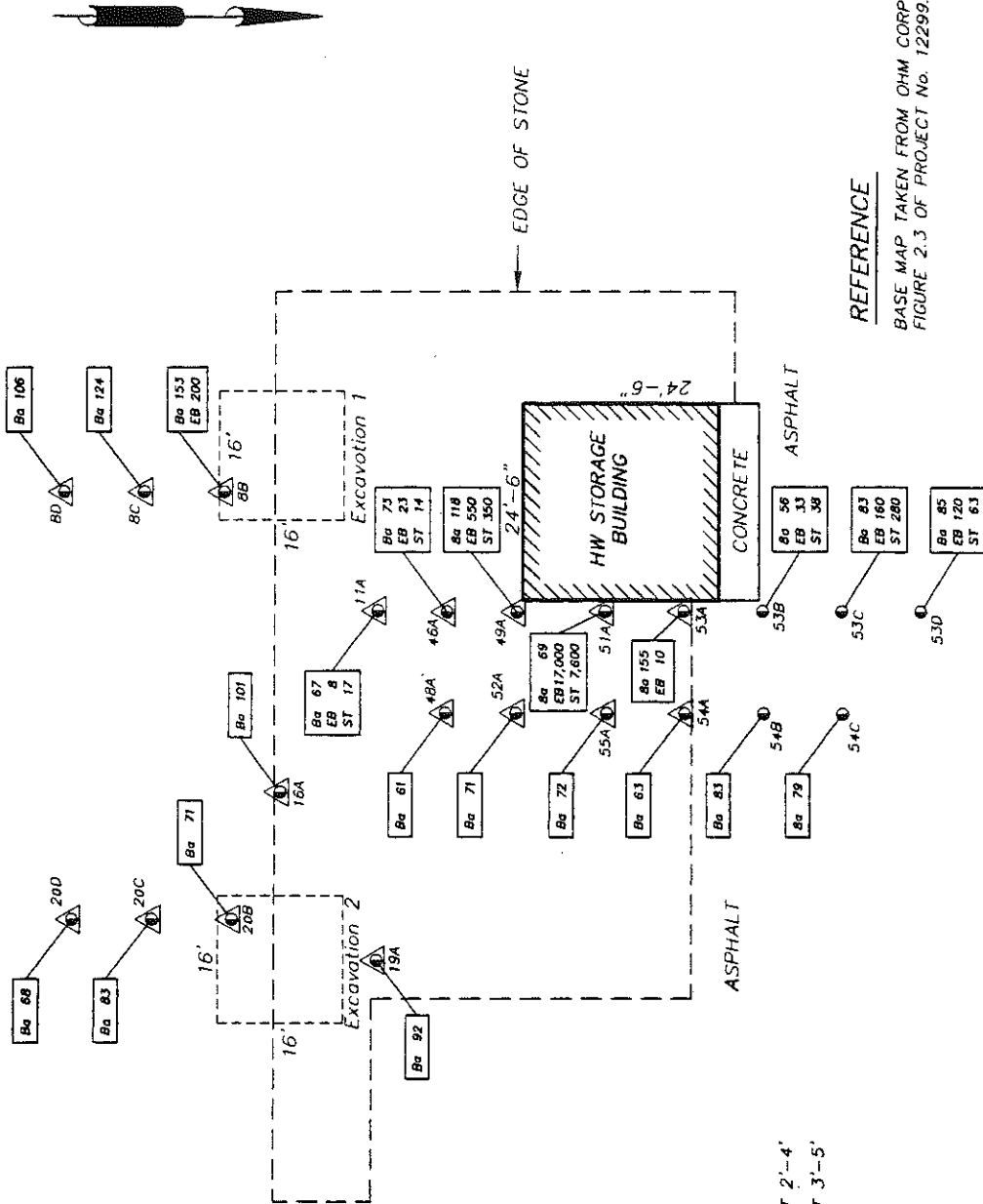


BACKGROUND SAMPLE LOCATIONS

HANGING ROCK CLOSURE		IRONTON, U.I.	
CLIENT: DOW CHEMICAL COMPANY		JOB NUMBER: 7015-500	
SCALE: AS SHOWN	FIGURE NUMBER: 4	REV 0	







PHASE IV SOIL SAMPLING RESULTS 2 TO 5 FEET BELOW GRADE			IRONTON, OH
HANGING ROCK CLOSURE		CLIENT: OOW CHEMICAL COMPANY	JOB NUMBER: 7015-500
SCALE: AS SHOWN	FIGURE NUMBER	7	REV 0



LEGEND

--- APPROXIMATE EXTENT OF
DRUM STORAGE AREA

▲ PHASE IV SAMPLE POINT COLLECTED AT 2'-4'

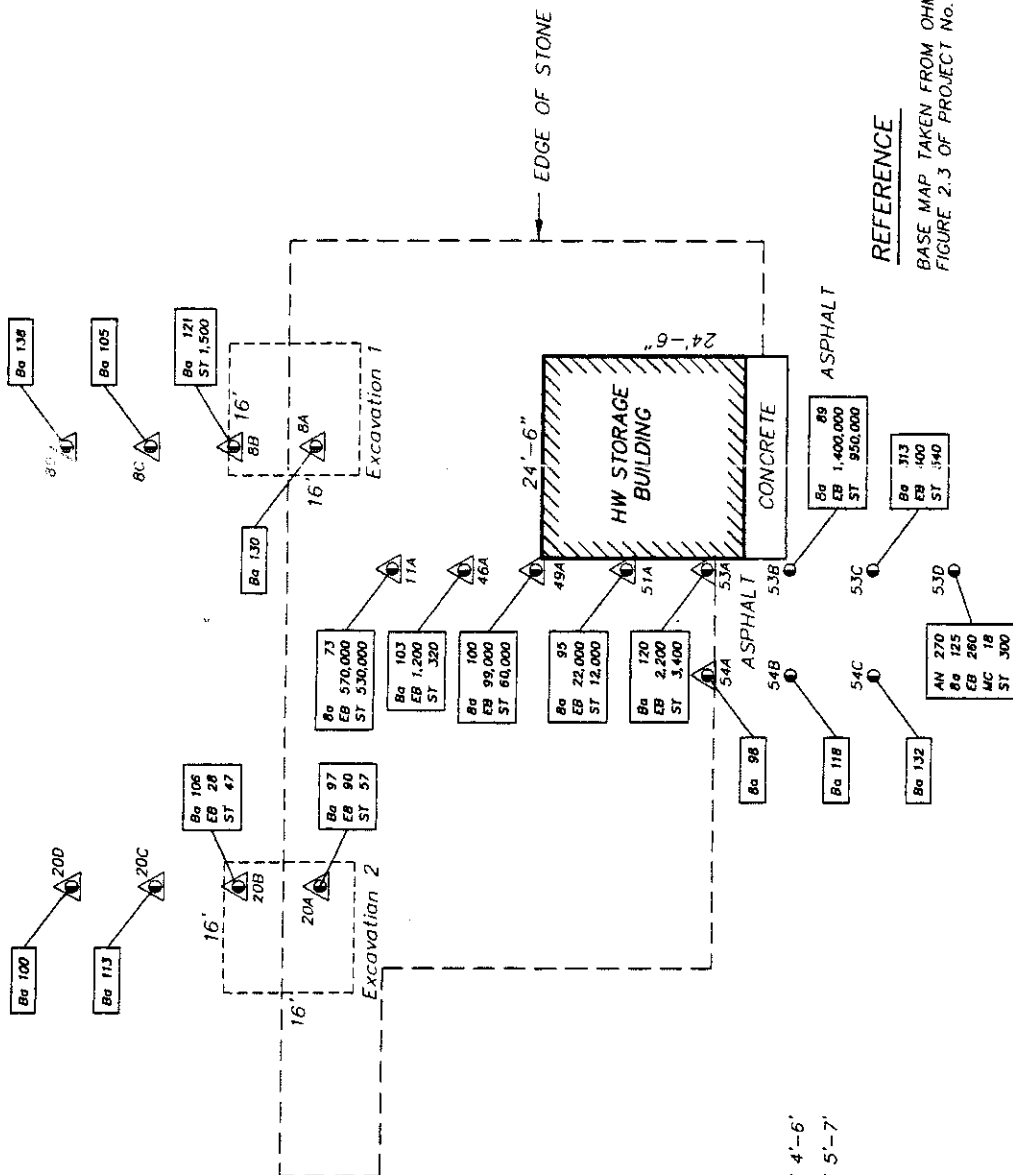
● PHASE IV SAMPLE POINT COLLECTED AT 3'-5'

KEY TO ABBREVIATIONS

EB ETHYLBENZENE
AN ACRYLONITRILE
ST STYRENE
MC METHYLENE CHLORIDE
BA BARIUM

NOTE: CONCENTRATIONS GIVEN IN $\mu\text{g}/\text{kg}$
EXCEPT FOR BARIUM, GIVEN IN mg/kg .





LEGEND

--- APPROXIMATE EXTENT OF
DRUM STORAGE AREA

▲ PHASE IV SAMPLE POINT COLLECTED AT 4'-6"

● PHASE IV SAMPLE POINT COLLECTED AT 5'-7"

KEY TO ABBREVIATIONS

EB ETHYLBENZENE
AN ACRYLONITRILE
ST STYRENE
MC METHYLENE CHLORIDE
BA BARIUM

NOTE: CONCENTRATIONS GIVEN IN $\mu\text{g}/\text{kg}$
EXCEPT FOR BARIUM, GIVEN IN mg/kg .



0 15 30
FEET



PHASE IV SOIL SAMPLING RESULTS 4 TO 7 FEET BELOW GRADE

HANGING ROCK CLOSURE

IRONTON, OH

JOB NUMBER: 7015-500

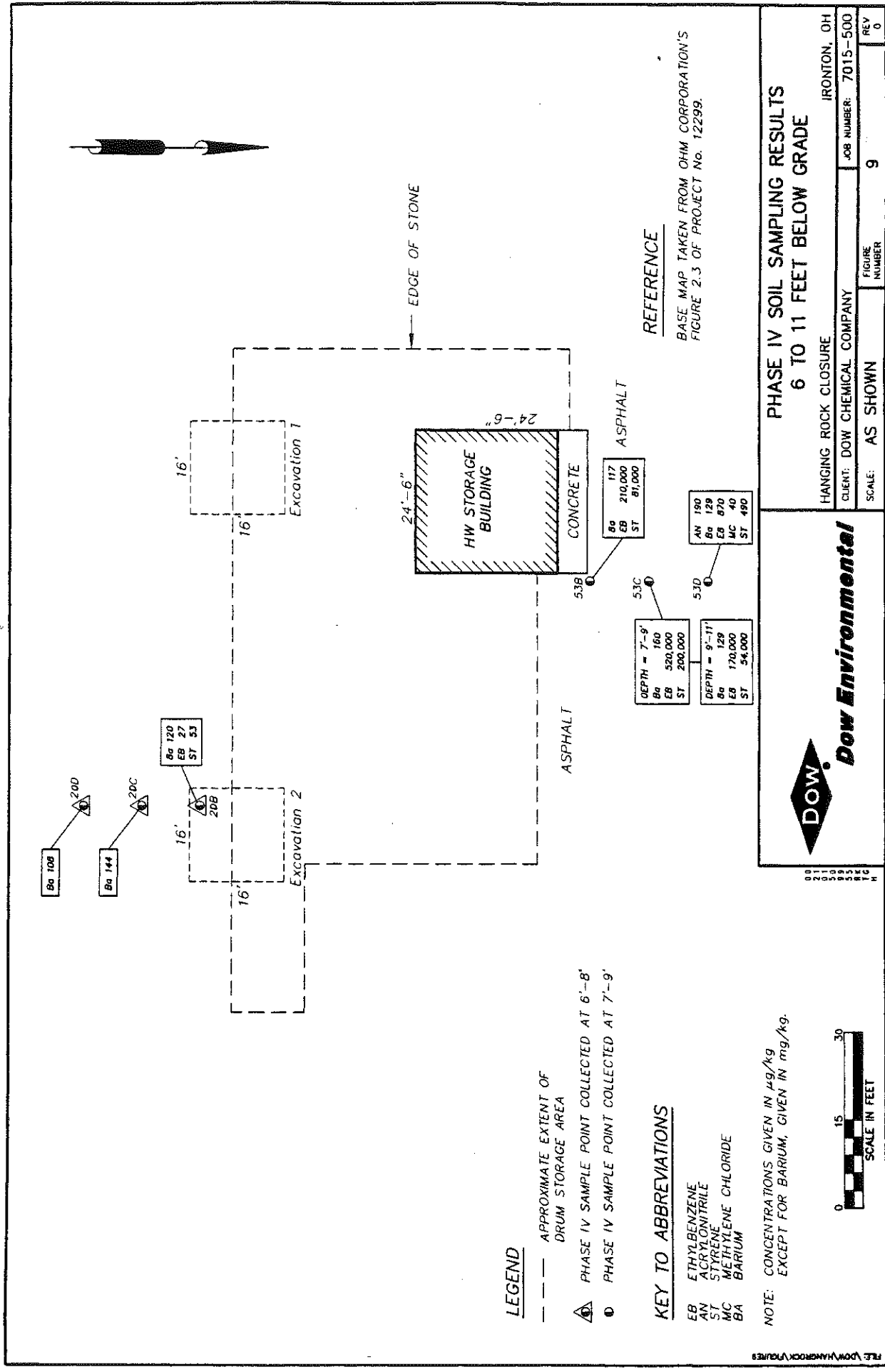
CLIENT: DOW CHEMICAL COMPANY

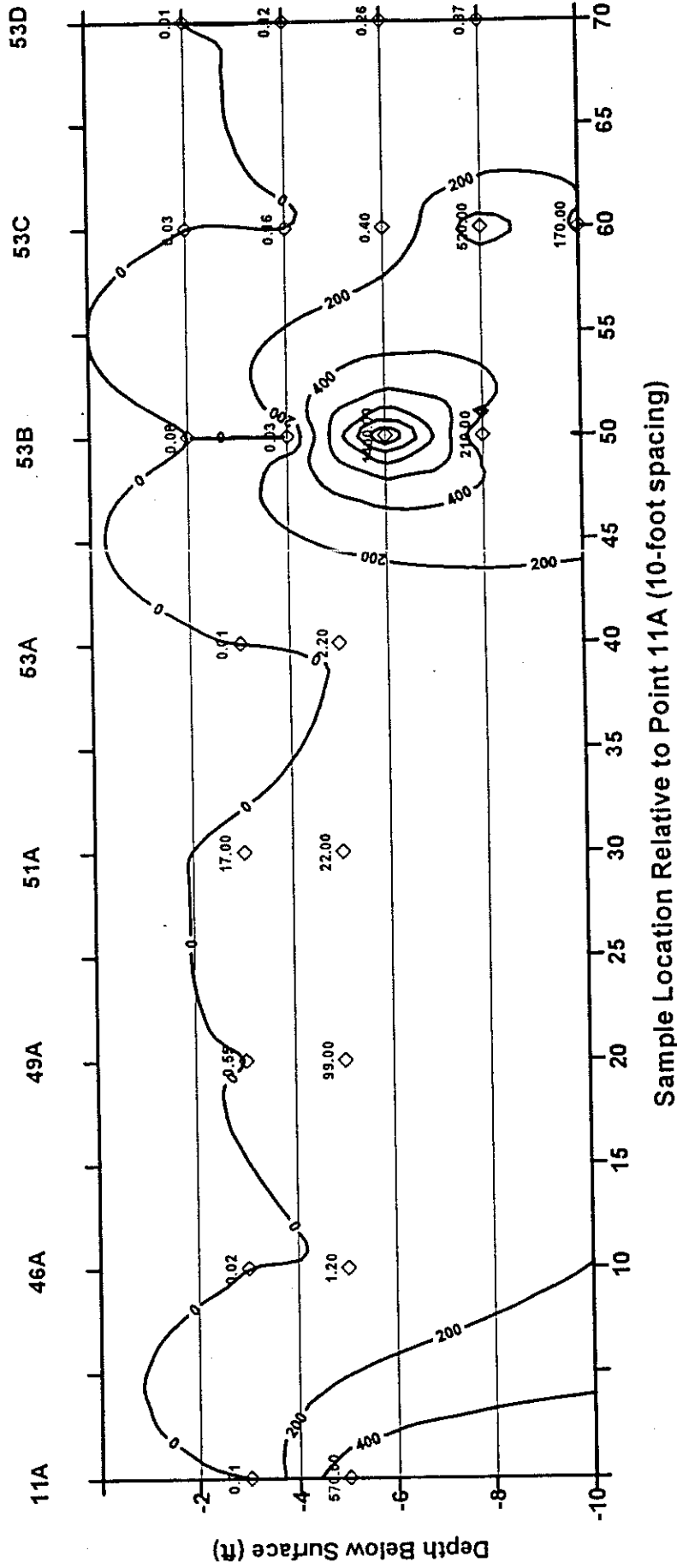
SCALE: AS SHOWN

FIGURE
NUMBER

8

REV
0





NOTE: THIS FIGURE REPRESENTS
PHASE IV SAMPLING CONDUCTED
FROM 10/20/94 TO 10/22/94.
CONTOUR INTERVAL IS 200mg/kg.

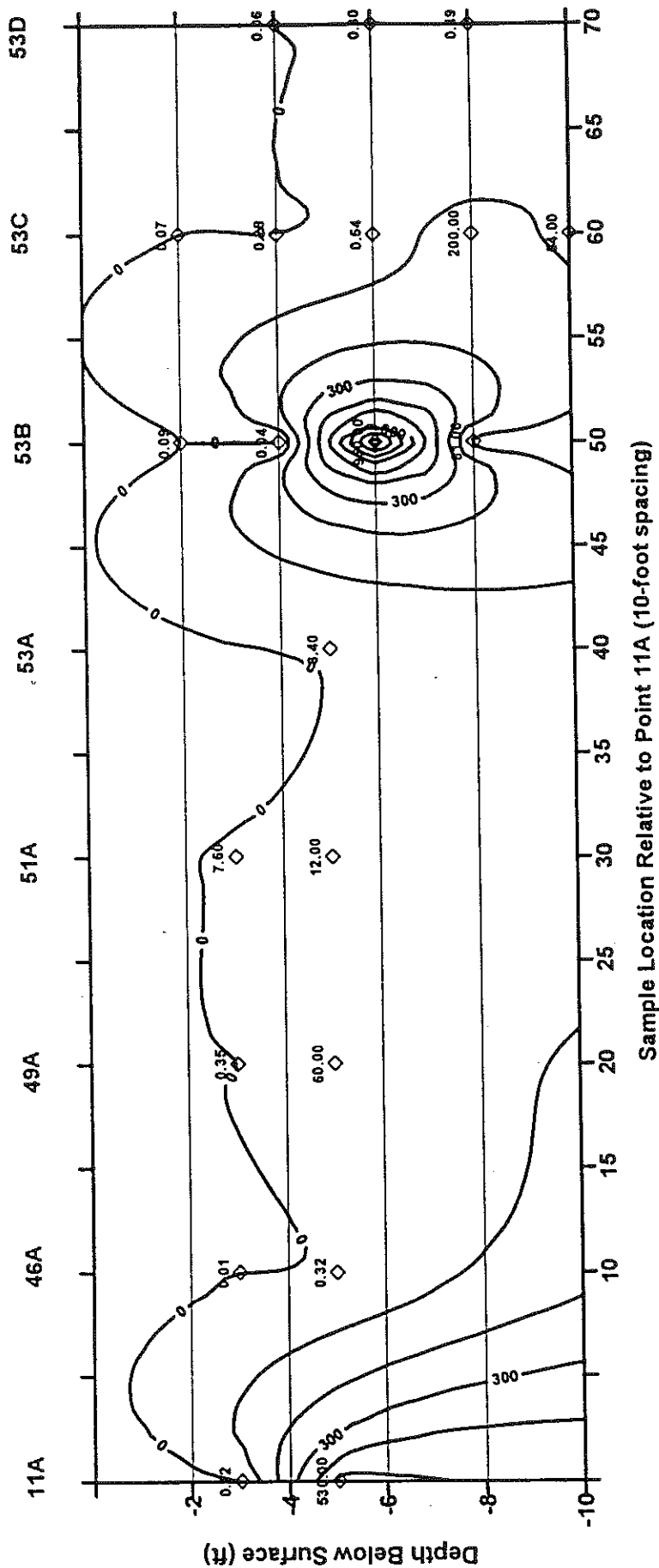


Dow Environmental

VERTICAL PROFILE OF ETHYLBENZENE
CONCENTRATIONS IN SOIL (mg/kg)

HANGING ROCK - OLD DRUM STORAGE AREA IRONTON, OH
CLIENT: DOW CHEMICAL COMPANY JOB NUMBER: 7015-500

SCALE: NONE FIGURE NUMBER 10 REV 0



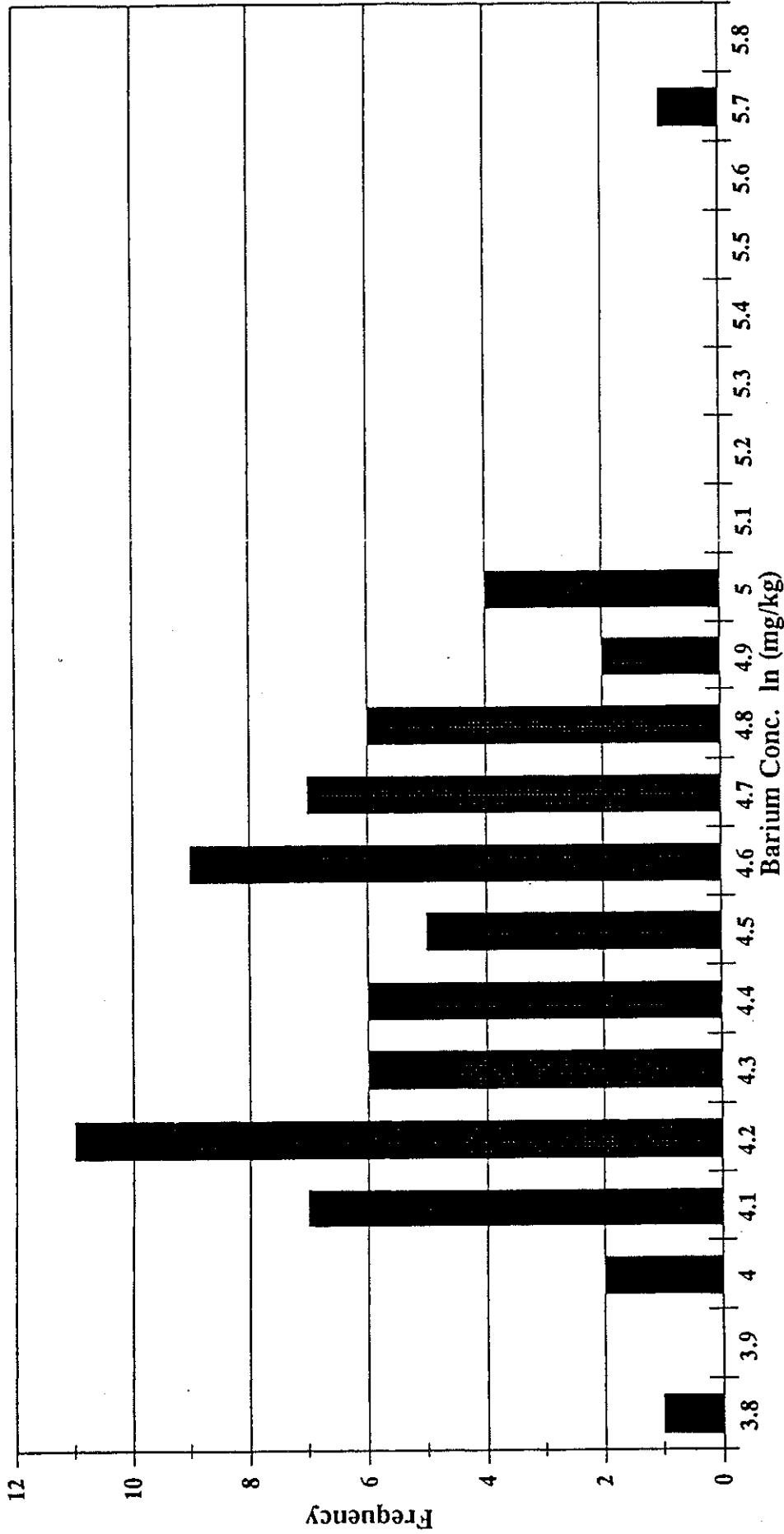
NOTE: THIS FIGURE REPRESENTS
PHASE IV SAMPLING CONDUCTED
FROM 10/20/94 TO 10/22/94.
CONTOUR INTERVAL IS 100mg/kg.



Dow Environmental

VERTICAL PROFILE OF STYRENE CONCENTRATIONS IN SOIL (mg/kg)

HANGING ROCK - DLD DRUM STORAGE AREA	IRDRONTON, OH
CLIENT: DOW CHEMICAL COMPANY	JOB NUMBER: 7015-500
SCALE: NONE	FIGURE NUMBER: 11
	REV: 0



NOTE: THIS FIGURE REPRESENTS
PHASE IV SAMPLING CONDUCTED
FROM 10/20/94 TO 10/22/94.
CONTOUR INTERVAL IS 100mg/kg.



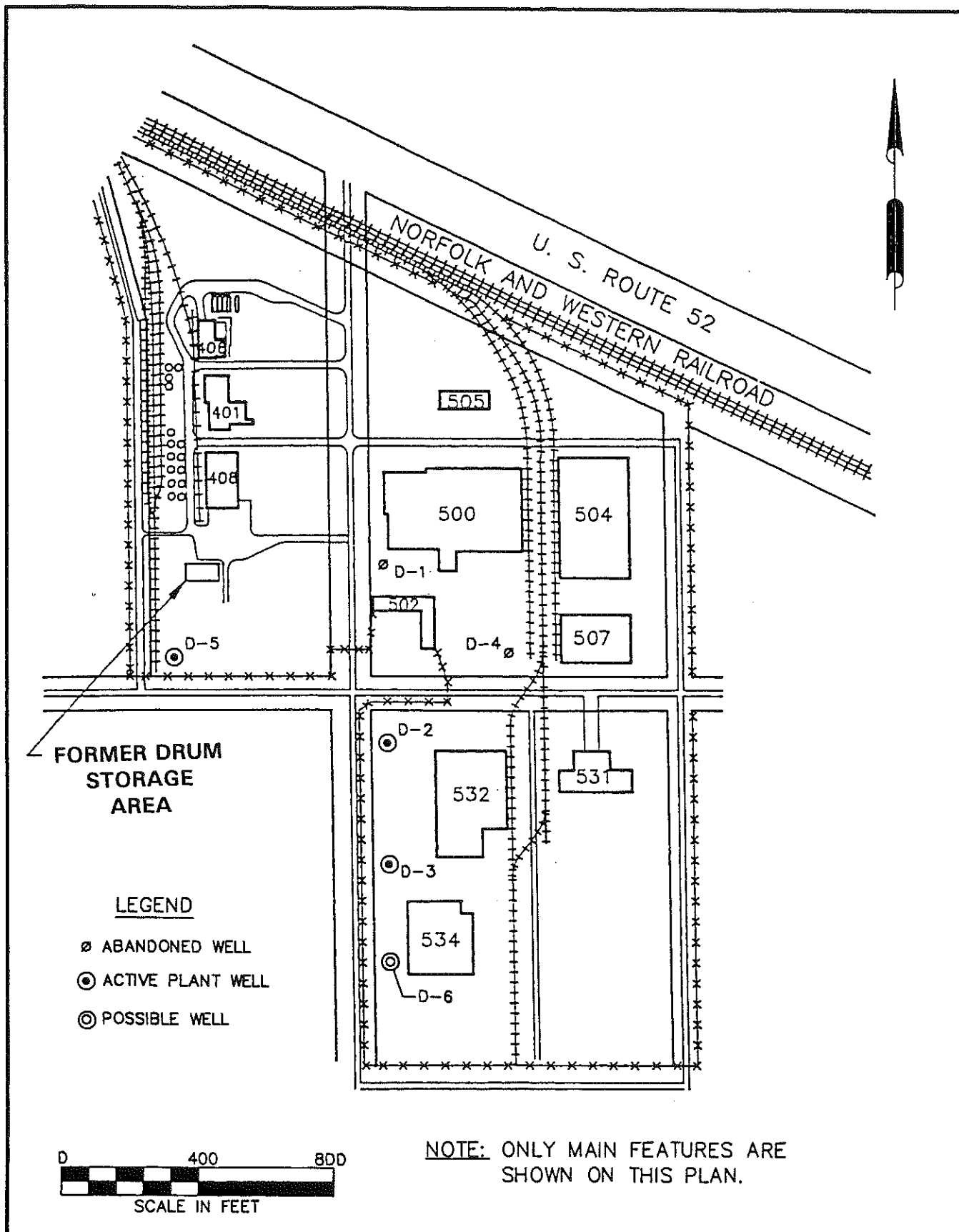
Dow Environmental

HISTOGRAM OF BARIUM CONCENTRATIONS NATURAL LOG TRANSFORM

HANGING ROCK - OLD DRUM STORAGE AREA IRONTON, OH

CLIENT: DOW CHEMICAL COMPANY JOB NUMBER: 7015-500

SCALE: NONE FIGURE NUMBER 12 REV 0



Dow Environmental

DOW PLANT WELL LOCATIONS

HANGING ROCK CLDSURE

IRONTON, OH

CLIENT: DOW CHEMICAL COMPANY

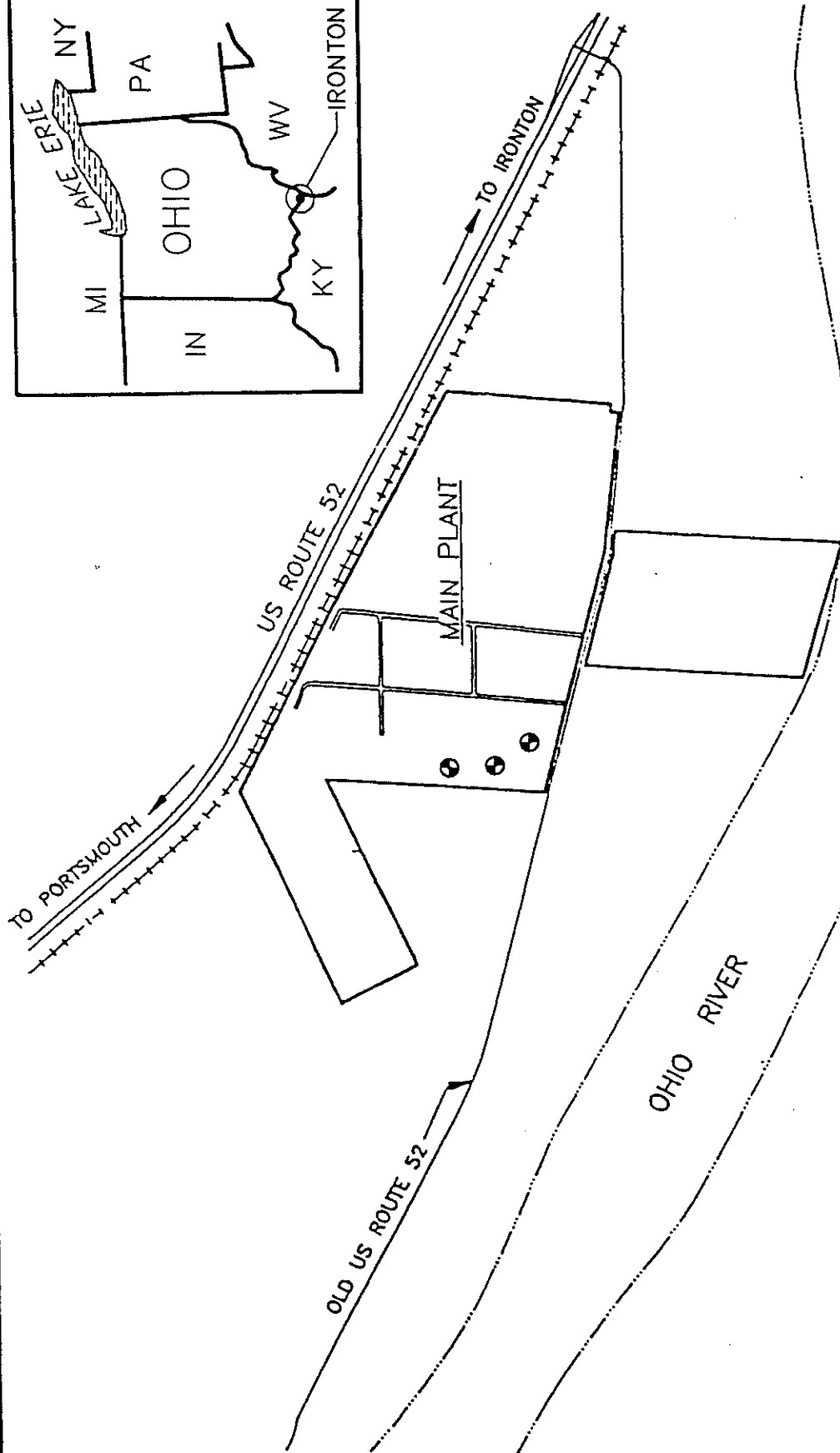
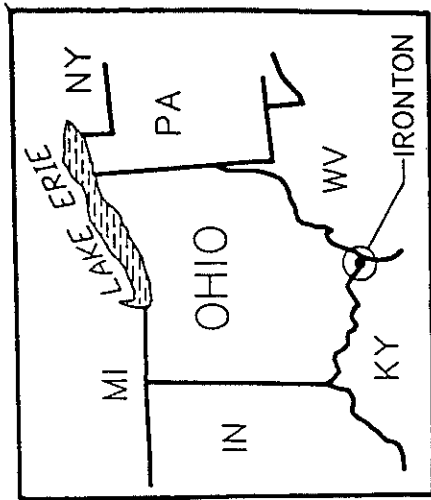
JOB NUMBER: 7015-500

SCALE: AS SHOWN

FIGURE
NUMBER

13

REV
0



KENTUCKY



Dow Environmental

PROPOSED GROUNDWATER MONITORING WELL LOCATIONS

HANGING ROCK CLOSURE	IRONTON, OH
CLIENT: DOW CHEMICAL COMPANY	JOB NUMBER: 7015-500
SCALE: AS SHOWN	FIGURE NUMBER: 14
	REV: 0

**PHASE IV SAMPLING REPORT AND
MANAGEMENT PLAN**

FOR

**FORMER DRUM STORAGE AREA
HANGING ROCK PLANT
IRONTON, OHIO**

VOLUME TWO: APPENDICES

PREPARED FOR

THE DOW CHEMICAL COMPANY

PREPARED BY

**DOW ENVIRONMENTAL INC.
PITTSBURGH, PENNSYLVANIA**

PROJECT NUMBER 7015.500

FEBRUARY 1995

APPENDIX A

SAMPLING AND ANALYSIS PLAN ADDITIONAL SAMPLING

**SAMPLING AND ANALYSIS PLAN
ADDITIONAL SAMPLING**

FOR

OLD DRUM STORAGE AREA

**HANGING ROCK PLANT
IRONTON, OHIO**

**Prepared for:
THE DOW CHEMICAL COMPANY**

**Prepared by:
AWD TECHNOLOGIES, INC.
PITTSBURGH, PENNSYLVANIA**

PROJECT NUMBER 7015-500

SEPTEMBER 1994

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FIGURES

NUMBER

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|---|---------------------------------------|
| 1 | Tentative Background Sample Locations |
| 2 | Sample Locations Soil Analysis |
| 3 | Chain-of-Custody Form |

TABLES

NUMBER

- | | |
|---|----------------------------------|
| 1 | Proposed Soil Sampling Locations |
|---|----------------------------------|

1.0 INTRODUCTION

This Sampling and Analysis Plan describes soil sampling that will aid in adequately defining the horizontal and vertical extent of contamination associated with the Old Drum Storage Area at the Dow Chemical Company, Hanging Rock Plant in Ironton, Ohio. The data obtained from this phase of sampling will be used in support of the Human Health Risk Assessment (HHRA) for this Closure Plan. Once the HHRA has been deemed representative of worst-case site concentrations by OEPA, the Closure Plan will be revised, as needed, so that closure activities may proceed.

Three phases of closure activities have previously been conducted at this site. Those phases were conducted prior to incorporation of a human health-based approach for closure of this area. The potential health risks of two of the five constituents identified at this site, ethylbenzene (EB) and styrene (ST), were evaluated in the HHRA prepared as a supplement to the Closure Plan Modification for this site. The OEPA has subsequently requested that additional sampling be conducted to demonstrate that concentrations of EB and ST used in the HHRA are representative of the worst-case site contamination. Consequently, this Sampling Plan has been devised, in part, to provide surface soil data appropriate to demonstrating that concentrations of EB and ST decrease away from the site. The intent is to demonstrate that concentrations decrease at three consecutive points relative to previously detected surface concentrations.

In addition, OEPA has requested confirmation sampling relative to headspace data collected during Phase III of closure activities. This sampling will be confined to a maximum of 8 feet in depth. The 8-foot depth has been established relative to prior investigations that established an underground sewer line as a potential source of acrylonitrile (AN), ST, and EB. Vertical profiles based on headspace data (reported in the Closure Plan Modification as Figure 4) concluded that the sewer line was the likely source of these contaminants.

2.0 SAMPLING PROTOCOL

2.1 Sample Type and Parameters to be Analyzed

All soil samples collected during this phase of investigation will be discrete grab samples. Soil samples collected during this phase will be analyzed for acrylonitrile (AN), styrene (ST), methylene chloride (MC), ethylbenzene (EB), and barium (Ba).

2.2 Sampling Locations and Number

2.2.1 Background Samples

Two areas have been identified on Figure 1 for background surface soil sampling. These areas have been selected to represent areas not directly affected by the RCRA unit. These areas also are of the same soil horizon as material at the Old Drum Storage Area. Twelve soil samples will be collected from one or both of these areas. The actual sample locations will be determined in the field by a geologist. These soil samples will be used to establish a site-specific background concentration for naturally-occurring barium in soil.

2.2.2 Vertical and Horizontal Extent

Twelve new soil borings will be installed to evaluate the vertical and horizontal extent of contamination. These borings will be sampled at the surface, at the 2 to 3 foot depth, at the 5 to 6 foot depth, and at the 7 to 8 foot depth. These borings are identified on Figure 2. These locations coincide with previously collected sample points where constituent concentrations did not display a decreasing trend over three consecutive locations.

Ten additional locations will be sampled for surface soils. Eight of these locations will require penetration of existing asphalt for collection of surface soils within 1 foot of the surface.

Twenty-eight of these samples may not require analysis. These samples are identified in Table 1. Analysis will not be performed if a decreasing trend in concentrations is demonstrated by the adjacent sample points.

2.2.3 Headspace Confirmation

Nineteen samples will be collected from 13 separate borings to confirm prior headspace data. These sample locations are shown in Figure 2 and are summarized in Table 1.

2.3 Sampling Methods

2.3.1 Soil Borings

Soil sampling will be conducted with the Geoprobe sampling system. Geoprobe is a truck-mounted push probe sampling system.

Borings will be drilled using the truck-mounted Geoprobe system to a depth of 8 feet. This system advances an approximately 1 3/4-inch diameter boring by use of a hydraulic hammer which drives a threaded push rod into the subsurface until the desired sampling depth is attained. No drill cuttings are generated by this process. Soil samples are obtained by loosening the drive point of the push rod and inserting a smaller diameter threaded rod through the drilling string. This smaller diameter rod is used to turn (loosen) the drive point. A sample can then be collected by advancing the drill string with the hydraulic hammer. After collection, all drill rods are removed from the borehole. The soil sample is contained within the drive point sampler which acts as the lead rod. The sample is collected within a clear acetate inner liner which is pushed out of the outer sampling tube.

Once removed, the sample is logged and containerized for laboratory analysis. The samples will be logged by the onsite field personnel in accordance with the unified Soil Classification System (USCS). Samples will be stored in sealed 8 ounce glass jars at 4°C throughout shipment to the offsite laboratory.

Upon completion of drilling, each borehole will be sealed with a cement/bentonite grout. Wastes generated from investigation activities will be containerized onsite in sealed drums for future offsite disposal.

3.0 EQUIPMENT DECONTAMINATION

Decontamination of all sampling equipment will occur at the beginning and end of the entire sampling event. Sample recovery rods used in the collection of subsurface soil samples at discrete depths will be decontaminated between the collection of the individual samples. Trowels/scoops used for surface sampling will be decontaminated prior to and following collection of each sample.

A portable decontamination station will be set up at a predetermined location. Necessary equipment and materials include: brushes for dry and wet removal of soils adhering to equipment; pails to collect washwaters, rinse water(s), and solvent (hexane) rinse; potable rinse water; polar water; hexane; and detergent wash.

The following procedures will be employed for the proper decontamination of sampling equipment:

- Soils adhering to equipment are brushed off (dry)
- Rinse and/or wet brushing of equipment in a pail of potable water is performed followed by
- Detergent washing of equipment over a washwater collection pail
- Second potable water rinse over the waste collection pail
- Solvent rinse over the waste collection pail
- Polar water rinse over a rinsate water collection pail
- Air drying of equipment prior to reuse

Waste materials generated by the decontamination process will be drummed onsite and characterized as needed for disposal.

4.0 ANALYTICAL METHODS AND QA/QC

4.1 Laboratory

Samples will be shipped to Lancaster Laboratories, 2425 New Holland Pike, Lancaster, Pennsylvania 17601-5994 (Telephone 717-656-2301). Chain-of-custody forms will accompany all samples to the laboratory. A copy of each chain-of-custody form will be maintained by the Project Manager (an example form is attached as Figure 3).

4.2 Analysis

Samples will be analyzed for methylene chloride, ethylbenzene, acrylonitrile, and styrene by U.S. EPA SW-846 Method 8240. Samples will be analyzed for barium by SW-846 Method 7080. The holding times for the volatile organic analysis is 14 days and for metals analysis, 6 months. All concentration data will be reported, even if it is estimated, for compounds that have been positively identified in the sample.

4.3 Quality Assurance/Quality Control

Lancaster Laboratories is qualified in performed SW-846 Method 8240 and 7080. Sample analysis reports will include the following information: sample analysis result and detection limits, surrogate recoveries, sample holding times, and analysis of blanks and duplicates, as applicable. The laboratory will prepare trip blanks with each sample shipment as well as internal blanks and spikes.

The field and laboratory quality control requirements will include the following:

- Ten percent of field duplicate collection and analysis.
- One trip blank per cooler.

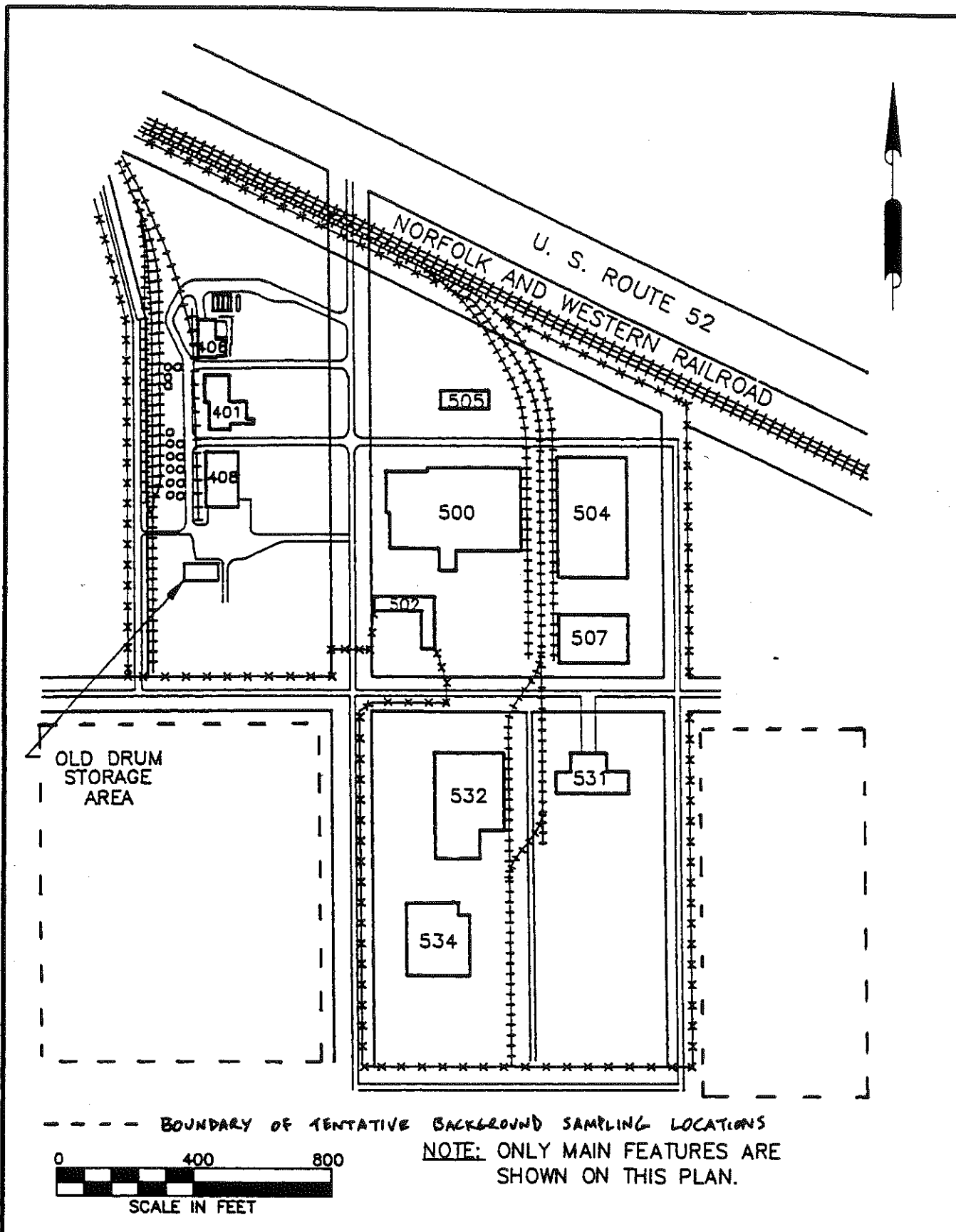
- Five percent of matrix spike and matrix spike duplicate sample collection and analysis.
- There are also specified frequencies for laboratory blanks (1/20) and duplicates (1/20) required for analytical quality control.

5.0 SCHEDULE

Field sampling activities will be scheduled to commence within 2 weeks, but no sooner than 5 working days, after verbal concurrence with this plan by OEPA. Field activities are anticipated to be completed within 3 days of initiation.

Laboratory results will be provided within 14 working days of receipt by the laboratory.

FIGURES



AWD TECHNOLOGIES, INC



TENTATIVE BACKGROUND SAMPLE LOCATIONS

HANGING ROCK CLOSURE

IRONTON, OH

CLIENT: DOW CHEMICAL COMPANY

JOB NUMBER: 7015-500

SCALE: AS SHOWN

FIGURE
NUMBER

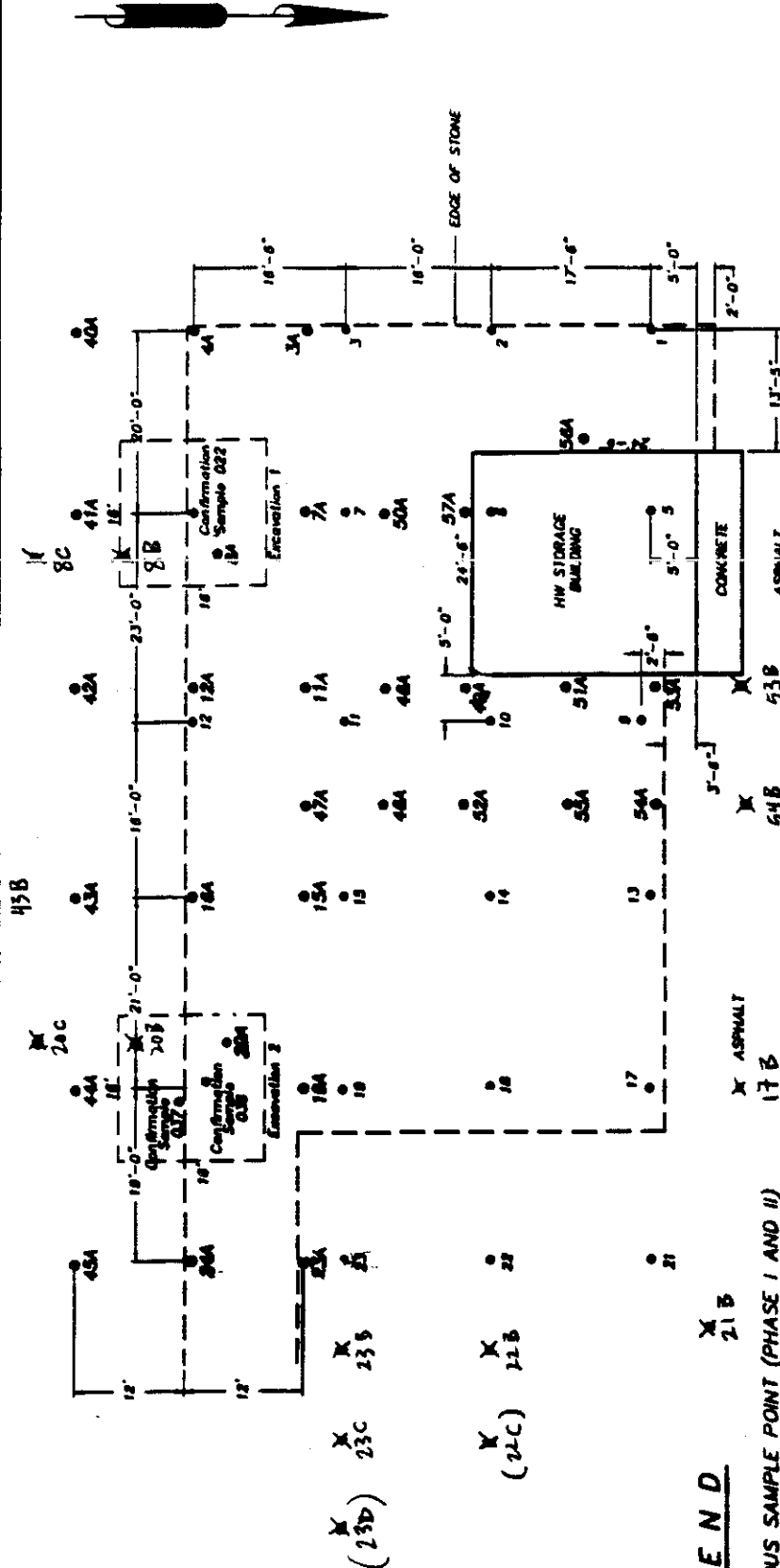
1

REV
0

X
(43C)

X
(20D)

X
(81)



LEGEND

- PREVIOUS SAMPLE POINT (PHASE I AND II)
(SAMPLES WERE NOT COLLECTED AT
SAMPLE POINTS 5 AND 6)
- PHASE II SAMPLE POINT COLLECTED FROM
2'-3" AND 5'-6" SAMPLE POINTS 8A AND
20A WERE ALSO SAMPLED FROM 8'-9".
SAMPLE POINTS 11A, 48A, 49A, 51A AND
53A WERE ALSO SAMPLED FROM 8'-9" AND
11'-12".

REFERENCE

BASE MAP TAKEN FROM OHM CORPORATION'S
FIGURE 2.3 OF PROJECT No. 12299.



X - Proposed boring location to
delineate extent of
contamination
(xxx) = Analysis of these samples
only if needed

AWD TECHNOLOGIES, INC.



SAMPLE LOCATIONS
SOIL
ANALYSIS

HANGING ROCK CLOSURE	IRONTON, OH
CLIENT: DOW CHEMICAL COMPANY	JOB NUMBER: 7015-500
SCALE: AS SHOWN	FIGURE NUMBER: 2
	REV: 0

FIGURE 3

CHAIN-OF-CUSTODY RECORD

TABLES

<p align="center">TABLE 1</p> <p align="center">PROPOSED SOIL SAMPLING LOCATIONS</p> <p align="center">DOW HANGING ROCK</p> <p align="center">PAGE 1 OF 2</p>							
Headspace Confirmation (vertical)			Horizontal Extent				
Location ^(a)	Depth		Location ^(a)	Depth			
	2'-3'	5'-6'		Surface	2'-3'	5'-6'	7'-8'
8A		X ^(b)	53B	X	X	X	O ^(c)
			53C	X	X	X	O
11A	X	X	53D	O	O	O	O
			54B	X	X	X	O
16A	X		54C	X	X	X	O
			54D	O	O	O	O
19A	X		17B	X			
			17C	O			
20A		X	21B	X			
			22B	X			
46A	X	X	22C	O			
			23B	X			
48A	X		23C	X			
			23D	O			

Notes

- (a) - Locations are indicated on Figure 2.
- (b) - X = Sample will be analyzed for acrylonitrile, styrene, methylene chloride, ethylbenzene, and barium
- (c) - O = Analysis of sample may not be required to delineate extent of contamination.

<p align="center">TABLE 1</p> <p align="center">PROPOSED SOIL SAMPLING LOCATIONS</p> <p align="center">DOW HANGING ROCK</p> <p align="center">PAGE 2 OF 2</p>							
Headspace Confirmation (vertical)			Horizontal Extent				
Location ^(a)	Depth		Location ^(a)	Depth			
	2'-3'	5'-6'		Surface	2'-3'	5'-6'	7'-8'
49A	X	X	20B	X	X	X	O
			20C	X	X	X	O
51A	X	X	20D	O	O	O	O
			43B	X			
52A	X		43C	O			
			8B	X	X	X	O
53A	X	X	8C	X	X	X	O
			8D	O	O	O	O
54A	X	X					
55A	X						

Notes

- ^(a) - Locations are indicated on Figure 2.
- ^(b) - X = Sample will be analyzed for acrylonitrile, styrene, methylene chloride, ethylbenzene, and barium
- ^(c) - O = Analysis of sample may not be required to delineate extent of contamination.

APPENDIX B

SAMPLE COLLECTION LOGS



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BD-02-102094

DATE & TIME COLLECTED: 10/20/94 0935

SAMPLE LOCATION: BD - South of Excavation 1

SAMPLE DESCRIPTION: Brown silt, little clay, trace
rock fragments and plant roots, moist

SAMPLE DEPTH INTERVAL: 0-2 Ft.

ANALYTICAL PARAMETERS: 8240 ± Barium

COMMENTS: Collected via Geoprobe — Horizontal
Extent Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-8D-24-102094

DATE & TIME COLLECTED: 10/20/94 0940

SAMPLE LOCATION: 8D - South of Excavation 1

SAMPLE DESCRIPTION: Soft, brown silt, little clay,
black organic staining, moist to wet

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent sample.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-8D-46-102094

DATE & TIME COLLECTED: 10/20/94 0945

SAMPLE LOCATION: 8D - South of Excavation 1

SAMPLE DESCRIPTION: Soft, brown silt, little clay,
moist to wet

SAMPLE DEPTH INTERVAL: 4-6 Ft

ANALYTICAL PARAMETERS: B240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Excent sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BD-68-102094

DATE & TIME COLLECTED: 10/20/94 0955

SAMPLE LOCATION: BD - South of Excavation 1

SAMPLE DESCRIPTION: Soft, brown silt, little clay,
moist to wet

SAMPLE DEPTH INTERVAL: 6-8 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Gesprobe - Horizontal
Extent sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BC-02-102094

DATE & TIME COLLECTED: 10/20/94 1000

SAMPLE LOCATION: BC - South of Excavation 1

SAMPLE DESCRIPTION: Medium stiff, light brown silt,
little clay, plant debris, moist

SAMPLE DEPTH INTERVAL: 0-2 Ft

ANALYTICAL PARAMETERS: 8240 mm Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BC-24-102094

DATE & TIME COLLECTED: 10/20/94 1010

SAMPLE LOCATION: BC - South of Excavation 1

SAMPLE DESCRIPTION: Light brown to brown silt,
little clay, moist

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: 8240 - Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BC-46-102094

DATE & TIME COLLECTED: 10/20/94 1020

SAMPLE LOCATION: BC - South of Excavation 1

SAMPLE DESCRIPTION: Soft, brown, light gray-brown
mottles, silt, little clay, moist to wet

SAMPLE DEPTH INTERVAL: 4-6 Ft.

ANALYTICAL PARAMETERS: B240 & Barium

COMMENTS: Collected via Geoprobe - Horizontal
Excent sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-8C-68-102094

DATE & TIME COLLECTED: 10/20/94 1040

SAMPLE LOCATION: 8C - South of Excavation 1

SAMPLE DESCRIPTION: Soft, brown silt, some clay,
moist to wet

SAMPLE DEPTH INTERVAL: 6-8 Ft

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR - 8B - 02 - 102094

DATE & TIME COLLECTED: 10/20/94 1145

SAMPLE LOCATION: BB - South of Excavation 1

SAMPLE DESCRIPTION: light brown and light gray-brown
mottled Silt, little clay, plant debris,
moist

SAMPLE DEPTH INTERVAL: 0-2 Ft

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR - 8B - 24 - 102094

DATE & TIME COLLECTED: 10/20/94 1150

SAMPLE LOCATION: 8B - South of Excavation 1

SAMPLE DESCRIPTION: Soft, brown silt, little clay,
moist

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: 8240 Only

COMMENTS: Collected via Geoprobe - Horizontal
Extant. Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-8B-46-102094

DATE & TIME COLLECTED: 10/20/94 1155

SAMPLE LOCATION: 8B - South of Excavation 1

SAMPLE DESCRIPTION: Soft, brown silt, little to
some clay, moist to wet

SAMPLE DEPTH INTERVAL: 4-6 Ft.

ANALYTICAL PARAMETERS: 8240 + Barism

COMMENTS: Collected via Geoprobe - Horizontal
Extent sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BB-68-102094

DATE & TIME COLLECTED: 10/20/94 1205

SAMPLE LOCATION: BB - South of Excavation 1

SAMPLE DESCRIPTION: Very soft, brown, clay and
silt, wet

SAMPLE DEPTH INTERVAL: 6-8 Ft.

ANALYTICAL PARAMETERS: 8240 - Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent. Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-8B-24-102094

DATE & TIME COLLECTED: 10/20/94 1215

SAMPLE LOCATION: 8B - South of Excavation 1

SAMPLE DESCRIPTION: Soft, brown silt, some clay,
moist

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: Barium Only

COMMENTS: Collected via Geoprobe - Offset location
for 2-4 Ft Resample to collect
barium sample - Horizontal Extent. Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-11A-24-102094

DATE & TIME COLLECTED: 10/20/94 1355

SAMPLE LOCATION: 11A - Central portion of investigation
area

SAMPLE DESCRIPTION: Medium stiff, light brown, light
gray mottles, silt, little clay, moist.

SAMPLE DEPTH INTERVAL: 2-4 Ft.

ANALYTICAL PARAMETERS: 8240 & Barman

COMMENTS: Collected via Geoprobe - Headspace
Confirmation Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-11A-46-102094

DATE & TIME COLLECTED: 10/20/94 1410

SAMPLE LOCATION: 11A - Central portion of
Investigation area.

SAMPLE DESCRIPTION: Brown, olive-brown, medium to
Coarse grained sandstone fragments and sand,
moist.

SAMPLE DEPTH INTERVAL: 4-6 Ft.

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR - 46A - 24 - 102094

DATE & TIME COLLECTED: 10/20/94 1455

SAMPLE LOCATION: 46A - Central portion of investigation
area, north of 11A

SAMPLE DESCRIPTION: Brown, light gray mottles and
natural black-brown staining, silt, little clay,
moist.

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-46A-46-102094

DATE & TIME COLLECTED: 10/20/94 1505

SAMPLE LOCATION: 46A - Central portion of investigation
area, north of HA

SAMPLE DESCRIPTION: Medium stiff, brown, natural
black organic staining, silt, little clay,
moist

SAMPLE DEPTH INTERVAL: 4-6 Ft.

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-49A-24-102094

DATE & TIME COLLECTED: 10/20/94 1610

SAMPLE LOCATION: 49A - Central portion of investigation
area, north of 46A

SAMPLE DESCRIPTION: Brown, medium to coarse grained
sand, some silt, little rock fragments,
moist

SAMPLE DEPTH INTERVAL: 2-4 Ft.

ANALYTICAL PARAMETERS: 8240 Only

COMMENTS: Collected via Geoprobe - Headspace
confirmation sample.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DTR-49A-46-102094

DATE & TIME COLLECTED: 10/20/94 1620

SAMPLE LOCATION: 49A - Central portion of investigation
Area, north of 46A

SAMPLE DESCRIPTION: Brown, medium to coarse grained
sand, little silt, chemical odor (PID - 120 ppm),
moist to wet

SAMPLE DEPTH INTERVAL: 4-6 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-49A-24-102094

DATE & TIME COLLECTED: 10/20/94 1630

SAMPLE LOCATION: 49A - Central portion of investigation
area, north of 46A

SAMPLE DESCRIPTION: Brown, light gray mottles, silt,
some clay, wet

SAMPLE DEPTH INTERVAL: 2-4 Ft.

ANALYTICAL PARAMETERS: Barium Only

COMMENTS: Collected via Geoprobe - Offset location
for resample of 2-4 Ft. interval to
collect Barium sample - Headspace Confirmation
Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-51A-24-102094

DATE & TIME COLLECTED: 10/20/94 1710

SAMPLE LOCATION: 51A- East side of HW Storage
Building, north of 49A

SAMPLE DESCRIPTION: Brown silt, little clay, brown
medium to coarse grained sand @ 4.0', wet

SAMPLE DEPTH INTERVAL: 2-4 ft

ANALYTICAL PARAMETERS: 8240 Only

COMMENTS: Collected via Geoprobe - Headspace
Confirmation sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-51A-46-102094

DATE & TIME COLLECTED: 10/20/94 1715

SAMPLE LOCATION: 51A - East side of Hwl Storage
Building, north of 49A

SAMPLE DESCRIPTION: Dark brown coarse grained sand
and rock fragments, little silt, saturated

SAMPLE DEPTH INTERVAL: 4-6 Ft.

ANALYTICAL PARAMETERS: 8240 Only

COMMENTS: Collected via Geoprobe - Headspace
confirmation sample.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-51A-24-102094

DATE & TIME COLLECTED: 10/20/94 1730

SAMPLE LOCATION: 51A - East side of HW Storage
Building, north of 49A

SAMPLE DESCRIPTION: Brown, light gray mottles, silt
and clay, moist

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: Barium Only

COMMENTS: Collected via Geoprobe - Offset
location to resample 2-4 Ft interval
for Barium Sample - Headspace confirmation
Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-51A-46-102294

DATE & TIME COLLECTED: 10/20/94 1740

SAMPLE LOCATION: 51A - East side of HW Storage
Building, north of 49A

SAMPLE DESCRIPTION: Soft, brown, light gray
mottles, silt, little clay, moist to wet

SAMPLE DEPTH INTERVAL: 4 - 6 Ft.

ANALYTICAL PARAMETERS: Barium Only

COMMENTS: Collected via Geoprobe - offset location
to resample 4-6 Ft interval for barium sample
- Headspace confirmation sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53A-24-102194

DATE & TIME COLLECTED: 10/21/94 0930

SAMPLE LOCATION: 53A - East side of Hw Storage
Building, north of 51A

SAMPLE DESCRIPTION: Brown silt, some clay, moist

SAMPLE DEPTH INTERVAL: 2-4 Ft.

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53A-46-122194

DATE & TIME COLLECTED: 10/21/94 0935

SAMPLE LOCATION: 53A - East side of H₂O Storage
Building, north of 51A

SAMPLE DESCRIPTION: Brown silt and clay, moist

SAMPLE DEPTH INTERVAL: 4-6 Ft.

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation Sample.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR- 53B- 13- 102194

DATE & TIME COLLECTED: 10/21/94 1011

SAMPLE LOCATION: 53B - Northeast Corner of HW
Storage Building, north of 53A

SAMPLE DESCRIPTION: Brown, light gray mottles, silt,
some clay, moist

SAMPLE DEPTH INTERVAL: 1-3 Ft.

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected with Geoprobe - Horizontal
Extent - Asphalt Surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53B-35-102194

DATE & TIME COLLECTED: 10/21/94 1015

SAMPLE LOCATION: 53B - Northeast corner of HW
Storage Building, north of 53A

SAMPLE DESCRIPTION: Brown silt, some clay, trace
shale fragments, Saturated

SAMPLE DEPTH INTERVAL: 3-5 Ft.

ANALYTICAL PARAMETERS: 8240 - Barium

COMMENTS: Collected with Geoprobe - Horizontal
Extent - Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53B-57-102194

DATE & TIME COLLECTED: 10/21/94 1020

SAMPLE LOCATION: 53B - Northeast corner of HW
Storage Building, north of 53A

SAMPLE DESCRIPTION: Brown, fine to coarse grained
sand, trace very fine gravel, chemical odor
(PID-90 ppm), saturated

SAMPLE DEPTH INTERVAL: 5-7 Ft.

ANALYTICAL PARAMETERS: B240 Only

COMMENTS: Collected via Geoprobe - Horizontal
Extent - Asphalt surface.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53B-57-102194

DATE & TIME COLLECTED: 10/21/94 1055

SAMPLE LOCATION: 53B - Northeast Corner of Hw
Storage Building, north of 53A

SAMPLE DESCRIPTION: Brown, medium to coarse grained
sand, moist, chemical odor

SAMPLE DEPTH INTERVAL: 5-7 Ft.

ANALYTICAL PARAMETERS: Barium Only

COMMENTS: Collected via Geoprobe - Horizontal Extent -
Offset location for Resample of 5-7 Ft
Interval to collect Barium Sample - Asphalt
Surface.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53B-79-102194

DATE & TIME COLLECTED: 10/21/94 1100

SAMPLE LOCATION: 53B - Northeast corner of HW
Storage Building, north of 53A

SAMPLE DESCRIPTION: Brown silt, little clay,
Chemical odor (PID-79 ppm), wet

SAMPLE DEPTH INTERVAL: 7-9 Ft.

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent - Asphalt Surface.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53C-13-102194

DATE & TIME COLLECTED: 10/21/94 1120

SAMPLE LOCATION: 53C - Northcentral portion of
Investigation, north of HW Storage Building

SAMPLE DESCRIPTION: Light brown to brown, light gray
mottles, silt, little clay, slight chemical
odor, moist

SAMPLE DEPTH INTERVAL: 1-3 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal Extent
Sample - 8240 Duplicate also collected.
- Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53C-35-102194

DATE & TIME COLLECTED: 10/21/94 1145

SAMPLE LOCATION: 53C - North-central portion of
Investigation Area, north of 53B

SAMPLE DESCRIPTION: Brown, light gray mottles,
silt, little clay, moist

SAMPLE DEPTH INTERVAL: 3-5 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample - Asphalt Surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53C-57-102194

DATE & TIME COLLECTED: 10/21/94 1155

SAMPLE LOCATION: 53C - North - Central portion of
Investigation area, north of 53B

SAMPLE DESCRIPTION: Brown silt, little clay, moist

SAMPLE DEPTH INTERVAL: 5-7 Ft.

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal Extent
Sample - Asphalt Surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53C-79-102194

DATE & TIME COLLECTED: 10/21/94 1205

SAMPLE LOCATION: 53C - North-central portion of
Investigation area, north of 53B

SAMPLE DESCRIPTION: Light brown to brown silt, little
clay, moist to wet, slight chemical odor
(PID - 30 ppm)

SAMPLE DEPTH INTERVAL: 7-9 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
extent sample - Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53C-911-102194

DATE & TIME COLLECTED: 10/21/94 1215

SAMPLE LOCATION: 53C - North-central portion of
Investigation area, north of 53B

SAMPLE DESCRIPTION: Brown silt, little very fine
grained sand, trace clay, saturated

SAMPLE DEPTH INTERVAL: 9-11 Ft.

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample - Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53D-13-102194

DATE & TIME COLLECTED: 10/21/94 1340

SAMPLE LOCATION: 53D - North-Central portion of
Investigation area, north of 53C

SAMPLE DESCRIPTION: Light brown, iron staining,
silt, some clay, moist

SAMPLE DEPTH INTERVAL: 1-3 Ft.

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extant sample - Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53D-35-102194

DATE & TIME COLLECTED: 10/21/94 1345

SAMPLE LOCATION: 53D - North-Central portion of
Investigation area, north of 53C

SAMPLE DESCRIPTION: Light Brown, brown silt, little
clay, moist

SAMPLE DEPTH INTERVAL: 3-5 Ft.

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample - Asphalt surface.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-53D-57-102194

DATE & TIME COLLECTED: 10/21/94 1350

SAMPLE LOCATION: 53D - North-Central portion of
Investigation area, north of 53C

SAMPLE DESCRIPTION: Brown silt, little clay, moist

SAMPLE DEPTH INTERVAL: 5-7 Ft.

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent sample - Asphalt Surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR- 53D - 79 - 102194

DATE & TIME COLLECTED: 10/21/94 1400

SAMPLE LOCATION: 53D - North - Central portion of
Investigation area, north of 53C

SAMPLE DESCRIPTION: Brown silt, some clay, moist
to wet

SAMPLE DEPTH INTERVAL: 7-9 Ft.

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent sample - Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR - 54D - 13 - 102194

DATE & TIME COLLECTED: 10/21/94 1415

SAMPLE LOCATION: 54D - ~ 10' North of 54C, ~ 12'
East of 53D

SAMPLE DESCRIPTION: Brown to dark brown
silt, little clay, damp to moist

SAMPLE DEPTH INTERVAL: 1-3 Ft

ANALYTICAL PARAMETERS: 8240 ± Barium

COMMENTS: Collected via Geoprobe, Horizontal
Extent sample - Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-54D-35-102194

DATE & TIME COLLECTED: 10/21/94 1420

SAMPLE LOCATION: 54D - ~10' north of 54C; ~12'
east of 53D

SAMPLE DESCRIPTION: Brown, light gray mottles, silt,
little clay, moist to wet

SAMPLE DEPTH INTERVAL: 3-5 Ft.

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample - Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DAR-54D-57-102194

DATE & TIME COLLECTED: 10/21/94 1430

SAMPLE LOCATION: 54D - ~ 10' North of 53C ; ~ 12'
East of 53D

SAMPLE DESCRIPTION: Brown silt, little clay, moist

SAMPLE DEPTH INTERVAL: 5-7 Ft.

ANALYTICAL PARAMETERS: B240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent sample - Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-54D-79-102194

DATE & TIME COLLECTED: 10/21/94 1435

SAMPLE LOCATION: 54D - ~10' North of 54C ;
~12' East of 53D

SAMPLE DESCRIPTION: Brown silt, some clay, moist

SAMPLE DEPTH INTERVAL: 7-9' Ft.

ANALYTICAL PARAMETERS: 8240 ± Barwin

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample - Asphalt surface.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-54C-13-102194

DATE & TIME COLLECTED: 10/21/94 1455

SAMPLE LOCATION: 54C - ~ 10' north of 54B;
~ 12' east of 53C

SAMPLE DESCRIPTION: Stiff, brown, light gray mottles,
silt, little clay, moist

SAMPLE DEPTH INTERVAL: 1-3 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal Extent
Sample - Asphalt surface - Barium duplicate
Sample also collected.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-54C-35-102194

DATE & TIME COLLECTED: 10/21/94 1505

SAMPLE LOCATION: 54C - ~10' north of 54B ; ~12'
east of 53C

SAMPLE DESCRIPTION: Brown silt, little clay, moist

SAMPLE DEPTH INTERVAL: 3-5 Ft.

ANALYTICAL PARAMETERS: 8240 ± Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent sample - Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-54C-57-102194

DATE & TIME COLLECTED: 10/21/94 1510

SAMPLE LOCATION: 54C - ~ 10' north of 53B ;
~ 12' east of 53C

SAMPLE DESCRIPTION: Soft, brown silt, little clay,
trace black organic staining, moist

SAMPLE DEPTH INTERVAL: 5-7 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent sample - Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR - 54C - 79 - 102194

DATE & TIME COLLECTED: 10/21/94 1515

SAMPLE LOCATION: 54C - ~ 10' north of 54B ;
~ 12' east of 53C

SAMPLE DESCRIPTION: Medium stiff, brown silt,
little clay, trace very fine grained
sand, moist

SAMPLE DEPTH INTERVAL: 7-9 Ft.

ANALYTICAL PARAMETERS: 8240 ± Barium

COMMENTS: Collected via Geoprobe - Horizontal Extent
Sample - Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-54B-13-102194

DATE & TIME COLLECTED: 10/21/94 1530

SAMPLE LOCATION: 54B - Northcentral portion of site,
~ 10' south of 54C

SAMPLE DESCRIPTION: Medium stiff, brown to light brown,
silt, little clay, damp to moist

SAMPLE DEPTH INTERVAL: 1-3 Ft.

ANALYTICAL PARAMETERS: 8240 ± Barium

COMMENTS: Collected via Geoprobe - Horizontal Extent
Sample - Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-54B-35-102194

DATE & TIME COLLECTED: 10/21/94 1540

SAMPLE LOCATION: 54B - Northcentral area of
Investigation site, ~10' south of 54C

SAMPLE DESCRIPTION: Brown silt, little clay, moist

SAMPLE DEPTH INTERVAL: 3-5 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample - Asphalt surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-54B-57-102194

DATE & TIME COLLECTED: 10/21/94 1545

SAMPLE LOCATION: 54B - North central portion of
Investigation area, ~ 10' south of 54C

SAMPLE DESCRIPTION: Brown silt, some clay, moist

SAMPLE DEPTH INTERVAL: 5-7 Ft

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample - Asphalt Surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-54B-79-102194

DATE & TIME COLLECTED: 10/21/94 1550

SAMPLE LOCATION: 54B - North central portion of
Investigation area, ~10' south of 54C

SAMPLE DESCRIPTION: Brown silt, some clay, moist
to wet

SAMPLE DEPTH INTERVAL: 7-9 Ft

ANALYTICAL PARAMETERS: 8240 ± Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extant Sample - Asphalt @ surface.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-54A-24-102194

DATE & TIME COLLECTED: 10/21/94 1610

SAMPLE LOCATION: 54A - Northcentral portion of
Investigation Area - ~10' south of 54B

SAMPLE DESCRIPTION: Brown, light gray mottling, silt
little clay, damp

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-54A-46-102194

DATE & TIME COLLECTED: 10/21/94 1615

SAMPLE LOCATION: 54A - North central portion of
Investigation area, ~ 10' south of 54B

SAMPLE DESCRIPTION: Brown silt, little to some clay,
moist to wet

SAMPLE DEPTH INTERVAL: 4-6 Ft.

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-55A-24-102194

DATE & TIME COLLECTED: 10/21/94 1635

SAMPLE LOCATION: 55A - Northcentral portion of investi-
gation area, ~10' south of 54A

SAMPLE DESCRIPTION: Medium stiff, light brown to
brown silt, little clay, moist

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-52A-24-102194

DATE & TIME COLLECTED: 10/21/94 1650

SAMPLE LOCATION: 52A - Central portion of
Investigation area, ~ 10' south 55A

SAMPLE DESCRIPTION: Light brown to brown silt, little
clay, damp to moist

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-48A-24-102194

DATE & TIME COLLECTED: 10/21/94 1705

SAMPLE LOCATION: 48A - Central portion of
Investigation area - ~ 10' south of 52A

SAMPLE DESCRIPTION: Medium stiff, light brown to
brown, light gray mottles, silt, little
clay

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR - 17B - 13 - 102194

DATE & TIME COLLECTED: 10/21/94 1715

SAMPLE LOCATION: 17B - Northeast portion of
Investigation area, ~ 30' east of 54C

SAMPLE DESCRIPTION: Stiff, light brown to brown,
Silt, little clay, damp.

SAMPLE DEPTH INTERVAL: 1-3 Ft

ANALYTICAL PARAMETERS: 8240: Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent sample - Asphalt @ surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-17C-13-102194

DATE & TIME COLLECTED: 10/21/94 1730

SAMPLE LOCATION: 17C - Northeast corner of
Investigation area, ~10' north of 17B

SAMPLE DESCRIPTION: Medium stiff, light brown to
brown silt, little clay, damp to moist

SAMPLE DEPTH INTERVAL: 1-3 Ft

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent sample - Asphalt @ surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-19A-24-102294

DATE & TIME COLLECTED: 10/22/94 0910

SAMPLE LOCATION: 19A - East side of investigation
area, ~ 4' north of Excavation 2

SAMPLE DESCRIPTION: Brown silt, little clay, moist

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation sample - 8240 Duplicate
Sample also collected



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-20A-46-102294

DATE & TIME COLLECTED: 10/22/94 0920

SAMPLE LOCATION: 20A - East side of investigation
Area - Outside, west edge of Excavation 2

SAMPLE DESCRIPTION: Brown silt, some clay, moist
to wet

SAMPLE DEPTH INTERVAL: 4-6 Ft

ANALYTICAL PARAMETERS: 8240 + Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation Sample - Barium duplicate
sample also collected.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-208-02-102294

DATE & TIME COLLECTED: 10/22/94 0930

SAMPLE LOCATION: 208 - Outside, southern edge of
Excavation 2

SAMPLE DESCRIPTION: Brown and light brown silt,
little clay, moist

SAMPLE DEPTH INTERVAL: 0-2 Ft

ANALYTICAL PARAMETERS: B240 : Barium

COMMENTS: Collected via Geoprobe - Horizontal
extent sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-208-24-102294

DATE & TIME COLLECTED: 10/22/94 0935

SAMPLE LOCATION: 208 - Outside, southern edge of
Excavation 2

SAMPLE DESCRIPTION: Soft, light brown and brown
silt, little clay, moist

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: B240 : Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample - B240 Duplicate Sample
also collected.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-20B-46-102294

DATE & TIME COLLECTED: 10/22/94 0940

SAMPLE LOCATION: 20B - Outside, southern edge of
Excavation 2

SAMPLE DESCRIPTION: Brown to light brown silt,
little to some clay, moist to wet

SAMPLE DEPTH INTERVAL: 4-6 Ft

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-20B-68-102294

DATE & TIME COLLECTED: 10/22/94 0945

SAMPLE LOCATION: 20B - Outside, Southern edge
of Excavation 2

SAMPLE DESCRIPTION: Brown silt, some clay, trace
fine gravel and very fine grained sand,
moist to wet.

SAMPLE DEPTH INTERVAL: 6-8 Ft

ANALYTICAL PARAMETERS: 8240 ± Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-20C-Ø2-102294

DATE & TIME COLLECTED: 10/22/94 0955

SAMPLE LOCATION: 20C - Southeast portion of
Investigation Area, ~ 10' south of 20B

SAMPLE DESCRIPTION: Light Brown, dark black-brown
natural staining, silt, trace clay, damp.

SAMPLE DEPTH INTERVAL: Ø-2 FT

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Horizontal
Intest sample - Barium duplicate sample
also collected.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-20C-24-102294

DATE & TIME COLLECTED: 10/22/94 1010

SAMPLE LOCATION: 20C - Southeast portion of
Investigation area, ~ 10' south of 20B

SAMPLE DESCRIPTION: Brown silt, little clay, moist

SAMPLE DEPTH INTERVAL: 2-4' Ft

ANALYTICAL PARAMETERS: 8240 & Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample - Matrix spike (8240) sample
also collected



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-20C-46-102294

DATE & TIME COLLECTED: 10/22/94 1015

SAMPLE LOCATION: 20C - Southeast portion of
Investigation area, ~ 10' south of 20B

SAMPLE DESCRIPTION: Soft, brown silt, some clay,
moist to wet

SAMPLE DEPTH INTERVAL: 4-6 Ft

ANALYTICAL PARAMETERS: 8240 = Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample - Barium duplicate sample
also collected.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DAR-20C-6B-102294

DATE & TIME COLLECTED: 10/22/94 1020

SAMPLE LOCATION: 20C - Southeast portion of
Investigation area, ~ 10' south of 20B

SAMPLE DESCRIPTION: Soft, brown silt, some clay,
moist to wet

SAMPLE DEPTH INTERVAL: 6-8 Ft

ANALYTICAL PARAMETERS: 8240 + Barium

COMMENTS: Collected via Geoprobe, Horizontal
Extent Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-20D-02-102294

DATE & TIME COLLECTED: 10/22/94 1030

SAMPLE LOCATION: 20D - Southeast portion of
Investigation area, ~10' south of 20C

SAMPLE DESCRIPTION: Stiff, light brown, silt, trace
clay, damp

SAMPLE DEPTH INTERVAL: 0-2 Ft

ANALYTICAL PARAMETERS: 8240 mm Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-20D-24-102294

DATE & TIME COLLECTED: 10/22/94 1040

SAMPLE LOCATION: 20D - Southeast portion of
Investigation area, ~10' south of 20C

SAMPLE DESCRIPTION: Medium stiff, brown silt, little
Clay, moist

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-20D-46-102294

DATE & TIME COLLECTED: 10/22/94 1045

SAMPLE LOCATION: 20D - Southeast portion of
Investigation area, ~10' south of 20C

SAMPLE DESCRIPTION: Soft, brown silt, little clay,
moist to wet

SAMPLE DEPTH INTERVAL: 4-6 Ft

ANALYTICAL PARAMETERS: 8240 ± Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-20D-68-102294

DATE & TIME COLLECTED: 10/22/94 1055

SAMPLE LOCATION: 20D - Southeast corner of
Investigation area, ~10' south of 20C

SAMPLE DESCRIPTION: Soft, brown silt and clay,
moist to wet

SAMPLE DEPTH INTERVAL: 6-8 Ft

ANALYTICAL PARAMETERS: 8240 : Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR - 43C - Ø2 - 102294

DATE & TIME COLLECTED: 10/22/94 1100

SAMPLE LOCATION: 43C - Southeast portion of
Investigation area, ~10' south of 43B

SAMPLE DESCRIPTION: light brown, silt, trace clay,
damp.

SAMPLE DEPTH INTERVAL: Ø-2 Ft

ANALYTICAL PARAMETERS: 8240 & Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-43B-02-102294

DATE & TIME COLLECTED: 10/22/94 1105

SAMPLE LOCATION: 43B - Southeast portion of
Investigation area, ~ 23' south of 16A

SAMPLE DESCRIPTION: Stiff, light brown silt,
trace gravel, damp.

SAMPLE DEPTH INTERVAL: D-2 Ft

ANALYTICAL PARAMETERS: 8240 & Barwin

COMMENTS: Collected via Geoprobe, Horizontal
Extent Sample - 8240 Duplicate sample
also collected.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR - 23B - 13 - 102294

DATE & TIME COLLECTED: 10/22/94 1130

SAMPLE LOCATION: 23B - East side of investigation
area, ~ 10' west of 23C

SAMPLE DESCRIPTION: Brown and light brown silt, little
clay, trace plant roots, moist

SAMPLE DEPTH INTERVAL: 1-3 Ft

ANALYTICAL PARAMETERS: 8240 > Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent sample - Barium duplicate sample
also collected. - Asphalt @ surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-23C-13-102294

DATE & TIME COLLECTED: 10/22/94 1145

SAMPLE LOCATION: 23C - East side of investigation
area, ~ 10' east of 23B, ~ 16' south of 22C

SAMPLE DESCRIPTION: Brown, light gray mottles, silt,
some clay, moist

SAMPLE DEPTH INTERVAL: 1-3 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
extent sample, 8240 Duplicate sample
also collected - Asphalt @ surface



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-23D-13-102294

DATE & TIME COLLECTED: 10/22/94 1200

SAMPLE LOCATION: 23D - East side of excavation
area, ~ 10' east of 23C

SAMPLE DESCRIPTION: Brown silt, some clay, moist

SAMPLE DEPTH INTERVAL: 1-3' Ft

ANALYTICAL PARAMETERS: 8240 ÷ Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent sample - Asphalt @ surface.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-22B-13-102294

DATE & TIME COLLECTED: 10/22/94 1215

SAMPLE LOCATION: 22B - East side of
Investigation area, ~ 16' north of 23B

SAMPLE DESCRIPTION: Light brown to brown, light gray
mottles, silt, little to some clay, damp to
moist

SAMPLE DEPTH INTERVAL: 1-3 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample - Asphalt @ surface -
8240 duplicate sample also collected.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR - 22C - 13 - 102294

DATE & TIME COLLECTED: 10/22/94 1230

SAMPLE LOCATION: 22C - East side of investigation
Area, ~ 10' east of 22B

SAMPLE DESCRIPTION: Brown to light brown, silt,
little to some clay, dark black-brown natural
staining, moist

SAMPLE DEPTH INTERVAL: 1-3 FT

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe - Horizontal
Extent Sample - Asphalt @ surface -
Barium duplicate sample also collected.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-21B-13-102294

DATE & TIME COLLECTED: 10/22/94 1240

SAMPLE LOCATION: 21B - Northeast portion of
Investigation area, ~ 24' north of 22B

SAMPLE DESCRIPTION: Light brown to brown silt, little
clay, light gray mottles, moist.

SAMPLE DEPTH INTERVAL: 1-3 Ft

ANALYTICAL PARAMETERS: 8240 and Barium

COMMENTS: Collected via Geoprobe, Horizontal
Extent sample - Asphalt @ surface -
Barium duplicate sample also collected.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-16A-24-102294

DATE & TIME COLLECTED: 10/22/94 1250

SAMPLE LOCATION: 16A - South central portion of
Investigation area, ~ 25' north of 43B

SAMPLE DESCRIPTION: Light brown to brown silt,
little clay, moist

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: 8240 um Barium

COMMENTS: Collected via Geoprobe - Headspace
Confirmation Sample -



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BA-46-102294

DATE & TIME COLLECTED: 10/22/94 1340

SAMPLE LOCATION: BA - Southwest portion of investigation area; outside, east edge of excavation 1

SAMPLE DESCRIPTION: Soft, light brown to brown silt, some clay, moist

SAMPLE DEPTH INTERVAL: 4-6 Ft

ANALYTICAL PARAMETERS: B240 and Barium

COMMENTS: Collected via Geoprobe - Headspace confirmation sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BG1-02-102294

DATE & TIME COLLECTED: 10/22/94 1425

SAMPLE LOCATION: Grassy field south of
Investigation area

SAMPLE DESCRIPTION: Light brown, silt, trace clay,
plant/grass roots, moist

SAMPLE DEPTH INTERVAL: 0-2 Ft

ANALYTICAL PARAMETERS: Barium

COMMENTS: Collected via Geoprobe - Background
Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BG1-24-102294

DATE & TIME COLLECTED: 10/22/94 1430

SAMPLE LOCATION: Grassy field south of investigation
area

SAMPLE DESCRIPTION: _____

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: Barium

COMMENTS: Collected via Geoprobe - Background
Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BG1-46-102294

DATE & TIME COLLECTED: 10/22/94 1435

SAMPLE LOCATION: BG1 - grassy field south of
Investigation area.

SAMPLE DESCRIPTION: _____

SAMPLE DEPTH INTERVAL: 4-6 Ft

ANALYTICAL PARAMETERS: Barium

COMMENTS: Collected via Geoprobe - Background
Sample.



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BG1-68-102294

DATE & TIME COLLECTED: 10/22/94 1440

SAMPLE LOCATION: BG-1 - grassy field south of
Investigation area

SAMPLE DESCRIPTION: _____

SAMPLE DEPTH INTERVAL: 6-8 Ft

ANALYTICAL PARAMETERS: Barium

COMMENTS: Collected via Geoprobe - Background
Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BG2-Ø2-102294

DATE & TIME COLLECTED: 10/22/94 1450

SAMPLE LOCATION: BG-2 - Grassy field south
of investigation area

SAMPLE DESCRIPTION: _____

SAMPLE DEPTH INTERVAL: Ø-2 Ft

ANALYTICAL PARAMETERS: Barium

COMMENTS: Collected via Geoprobe - BACKGROUND
Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BG2-24-102294

DATE & TIME COLLECTED: 10/22/94 1455

SAMPLE LOCATION: BG-2 - South of investigation
area

SAMPLE DESCRIPTION: _____

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: Barium

COMMENTS: Collected via Geoprobe - Background
Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BG2-46-102294

DATE & TIME COLLECTED: 10/22/94 1500

SAMPLE LOCATION: BG-2 - South of investigation
Area

SAMPLE DESCRIPTION: _____

SAMPLE DEPTH INTERVAL: 4-6 Ft

ANALYTICAL PARAMETERS: Barium

COMMENTS: Collected via Geoprobe - Background
Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BG2-68-102294

DATE & TIME COLLECTED: 10/22/94 1505

SAMPLE LOCATION: BG-2 - Grassy field south of
Investigation area

SAMPLE DESCRIPTION: _____

SAMPLE DEPTH INTERVAL: 6-8' Ft

ANALYTICAL PARAMETERS: Barium

COMMENTS: Collected via Geoprobe - Background
Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BG-3-02-102294

DATE & TIME COLLECTED: 10/22/94 - 1510

SAMPLE LOCATION: BG-3 - Grassy field south of
Investigation area

SAMPLE DESCRIPTION: _____

SAMPLE DEPTH INTERVAL: 0-2 Ft

ANALYTICAL PARAMETERS: Barium

COMMENTS: Collected via Geoprobe - Background
Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BG3-24-102294

DATE & TIME COLLECTED: 10/22/94 1515

SAMPLE LOCATION: BG-3 - Grassy field south of
Investigation area

SAMPLE DESCRIPTION: _____

SAMPLE DEPTH INTERVAL: 2-4 Ft

ANALYTICAL PARAMETERS: Barium

COMMENTS: Collected via Geoprobe - Background
Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BG3-46-102294

DATE & TIME COLLECTED: 10/22/94 1520

SAMPLE LOCATION: BG-3 - Grassy field south of
Investigation area.

SAMPLE DESCRIPTION: _____

SAMPLE DEPTH INTERVAL: 4-6 Ft

ANALYTICAL PARAMETERS: Barium

COMMENTS: Collected via Geoprobe - Background

Sample



THE DOW CHEMICAL COMPANY
Hanging Rock Plant - Ironton, OH
Additional Sampling - Old Drum Storage Area
AWD Project No. 7015.600

SOIL SAMPLE COLLECTION LOG

SAMPLE IDENTIFICATION: DHR-BG3-68-102294

DATE & TIME COLLECTED: 10/22/94 1525

SAMPLE LOCATION: BG3 - Grassy field south of
Investigation Area.

SAMPLE DESCRIPTION: _____

SAMPLE DEPTH INTERVAL: 6-8 Ft

ANALYTICAL PARAMETERS: Barium

COMMENTS: Collected via Geoprobe - Background
Samples.

APPENDIX C

CHAIN-OF-CUSTODY



Where quality is a science.

For LTL use only

Acct. # 6948

Sample # 2207694-101

2207774-9

Please print. Instructions on reverse side correspond with circled numbers.

[illegible]

Analysis Request/ Environmental Services Chain of Custody



For LLI use only

Acct. # 6948

Sample # 2207694-14

Where quality is a science.

2207738-61

2207762-73

Please print. Instructions on reverse side correspond with circled numbers.

1 Client: <u>AWD TECHNOLOGIES</u> Acct. #: _____ Project Name/ #: <u>IRONSTON</u> PWSID #: _____ Project Manager: <u>KRIS MCCOSKEY</u> P.O. #: _____ Sampler: <u>D. MARTINEZ</u> Quote #: _____ Name of state where samples were collected: _____		4 Matrix <input type="checkbox"/> Potable <input type="checkbox"/> NPOES <input type="checkbox"/> Water		5 Analyses Requested (List analyses requested)		6 For LLI use only FSC: _____ SCN #: <u>1062250</u>	
2 Sample Identification Date Collected Time Collected DHR-19A-24-102294 102294 0910 DHR-20B-68-102294 102294 0945 DHR-20B-46-102294 102294 0940 DHR-20C-02-102294 102294 0955 DHR-20C-02DUP-102294 102294 0955 DHR-20C-24-102294 102294 1010 DHR-20D-46-102294 102294 1045 DHR-20D-24-102294 102294 1040 DHR-20D-02-102294 102294 1030		3 Composite Date Collected Time Collected X X X X X X X X X X X X X X X X X X		7 Turnaround Time Requested (TAT) (please circle): Normal Rush (Rush TAT is subject to LLI approval and surcharge.) Date results are needed: <u>PER CONTRACT</u> Rush results requested by (please circle): Phone Fax Phone #: <u>412 766 2717</u> Fax #: _____		8 Data Package Options (please circle if requested) QC Summary GLP Other Type I (Tier I) Yes No Type II (Tier II) Yes No Type III (NJ Red. Del.) Yes No Type IV (CLP) Yes No Site-specific QC required? Yes No (If yes, indicate QC sample and submit triplicate volume.) Internal Chain of Custody required? Yes No	
9 Relinquished by: <u>Andrew Miller</u> Date: <u>10/19/14</u> Time: <u>1400</u> Relinquished by: <u>[Signature]</u> Date: <u>10/22/14</u> Time: <u>1000</u> Relinquished by: _____ Date: _____ Time: _____ Relinquished by: _____ Date: _____ Time: _____ Relinquished by: _____ Date: _____ Time: _____		10 Received by: Date: _____ Time: _____ Received by: _____ Date: <u>10/24/14</u> Time: <u>1000</u> Received by: _____ Date: _____ Time: _____ Received by: _____ Date: _____ Time: _____ Received by: <u>[Signature]</u> Date: <u>10/24/14</u> Time: <u>0934</u>		11 Remarks HOLD HOLD HOLD HOLD HOLD HOLD HOLD HOLD		12 Percentage of samples upon receipt if requested _____	

Analysis Request Environmental Services Chain of Custody



Lancaster Laboratories
Where quality is a science.

For LU use only

Acct. # 6948

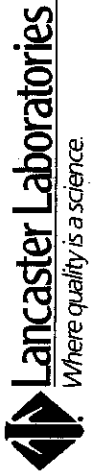
Sample # 2207762-61

2207762-73

Please print. Instructions on reverse side correspond with circled numbers.

1 Client: <u>AND TECHNOLOGIES</u> Acct. # _____ Project Name: <u>IRONTON</u> PWSID #: _____ Project Manager: <u>KRISTIN COSKEY</u> PO # _____ Sampler: <u>D. MARTIN</u> Quote #: _____ Name of state where samples were collected: _____		4 Matrix <input type="checkbox"/> Potable <input type="checkbox"/> NDES <input type="checkbox"/> Other		5 Analyses Requested FSC: _____ SCR #: <u>1062250</u>		6 Remarks (Ink or permanent marker only)																																																																																											
2 Sample Identification <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Date Collected</th> <th>Time Collected</th> <th>Compos.</th> <th>Soil</th> <th>Water</th> <th>Other</th> <th>Total # of Containers</th> </tr> </thead> <tbody> <tr> <td>DHR-23C-13DUP-102294</td> <td>10/22/94</td> <td>1145</td> <td>X</td> <td>X</td> <td></td> <td></td> <td>2</td> </tr> <tr> <td>DHR-23D-13-102294</td> <td>10/22/94</td> <td>1200</td> <td>X</td> <td>X</td> <td></td> <td></td> <td>2</td> </tr> <tr> <td>DHR-23B-13-102294</td> <td>10/22/94</td> <td>1215</td> <td>X</td> <td>X</td> <td></td> <td></td> <td>2</td> </tr> <tr> <td>DHR-23B-13DUP-102294</td> <td>10/22/94</td> <td>1215</td> <td>X</td> <td>X</td> <td></td> <td></td> <td>2</td> </tr> <tr> <td>DHR-23C-13-102294</td> <td>10/22/94</td> <td>1230</td> <td>X</td> <td>X</td> <td></td> <td></td> <td>2</td> </tr> <tr> <td>DHR-24-46-102294</td> <td>10/22/94</td> <td>1310</td> <td>X</td> <td>X</td> <td></td> <td></td> <td>2</td> </tr> <tr> <td>DHR-21B-13-102294</td> <td>10/22/94</td> <td>1240</td> <td>X</td> <td>X</td> <td></td> <td></td> <td>2</td> </tr> <tr> <td>DHR-16A-24-102294</td> <td>10/22/94</td> <td>1250</td> <td>X</td> <td>X</td> <td></td> <td></td> <td>2</td> </tr> <tr> <td>DHR-21B-13DUP-102294</td> <td>10/22/94</td> <td>1240</td> <td>X</td> <td>X</td> <td></td> <td></td> <td>1</td> </tr> <tr> <td>DHR-23C-13DUP-102294</td> <td>10/22/94</td> <td>1230</td> <td>X</td> <td>X</td> <td></td> <td></td> <td>1</td> </tr> </tbody> </table>		Sample ID	Date Collected	Time Collected	Compos.	Soil	Water	Other	Total # of Containers	DHR-23C-13DUP-102294	10/22/94	1145	X	X			2	DHR-23D-13-102294	10/22/94	1200	X	X			2	DHR-23B-13-102294	10/22/94	1215	X	X			2	DHR-23B-13DUP-102294	10/22/94	1215	X	X			2	DHR-23C-13-102294	10/22/94	1230	X	X			2	DHR-24-46-102294	10/22/94	1310	X	X			2	DHR-21B-13-102294	10/22/94	1240	X	X			2	DHR-16A-24-102294	10/22/94	1250	X	X			2	DHR-21B-13DUP-102294	10/22/94	1240	X	X			1	DHR-23C-13DUP-102294	10/22/94	1230	X	X			1	3 Relinquished by: <u>Andrew Miller</u>		7 Turnaround Time Requested (TAT) (please circle): Normal Rush (Rush TAT is subject to LU approval and surcharge.) <u>12 HRS</u> Date results are needed: _____ Rush results requested by (please circle): Phone Fax Phone #: <u>512 786 3717</u> Fax #: _____		8 Data Package Options (please circle if requested) QC Summary GLP Other Type I (Tier I) Yes No Type II (Tier II) Yes No Type III (NJ Red. Del.) Yes No Type IV (CLP) Yes No Site-specific QC required? Yes No (If yes, indicate QC sample and submit triplicate volume.) Internal Chain of Custody required? Yes No		9 Received by: Date Time <u>10/24/94</u> <u>1000</u> Relinquished by: Date Time <u>10/24/94</u> <u>1000</u> Relinquished by: Date Time <u>10/25/94</u> <u>0834</u>	
Sample ID	Date Collected	Time Collected	Compos.	Soil	Water	Other	Total # of Containers																																																																																										
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DHR-23D-13-102294	10/22/94	1200	X	X			2																																																																																										
DHR-23B-13-102294	10/22/94	1215	X	X			2																																																																																										
DHR-23B-13DUP-102294	10/22/94	1215	X	X			2																																																																																										
DHR-23C-13-102294	10/22/94	1230	X	X			2																																																																																										
DHR-24-46-102294	10/22/94	1310	X	X			2																																																																																										
DHR-21B-13-102294	10/22/94	1240	X	X			2																																																																																										
DHR-16A-24-102294	10/22/94	1250	X	X			2																																																																																										
DHR-21B-13DUP-102294	10/22/94	1240	X	X			1																																																																																										
DHR-23C-13DUP-102294	10/22/94	1230	X	X			1																																																																																										

Analysis Request/ Environmental Services Chain of Custody



For LLI use only
Acct. # 6948 Sample # 2207738-61

2207762-73

Please print. Instructions on reverse side correspond with circled numbers.

1 Client: <u>AUD TACHUNOL0612</u> Acct. #:		2		3		4 Matrix		5		6	
Project Name/#: <u>IRONTON</u> PWSID #:		Date Collected		Time Collected		Soil		Water		Remarks	
Project Manager: <u>Kris McCoskey</u> P.O. #:		Date		Time		Composite		Other		FSC: <u>1062230</u>	
Sampler: <u>D. MARTINEZ</u> Quote #:		Date		Time		Soil		Water		FSC: <u>1062230</u>	
Name of state where samples were collected:		Date		Time		Composite		Other		FSC: <u>1062230</u>	
Sample Identification		Date		Time		Composite		Other		FSC: <u>1062230</u>	
DHR-20C-24MS-102294		102294		1010		X		X		HOLD	
DHR-19A-24DUP-102294		102294		0910		X		X		HOLD	
DHR-20B-24DUP-102294		102294		0935		X		X		HOLD	
DHR-20D-68-102294		102294		1035		X		X		HOLD	
DHR-16MSD-24-102294		102294		1110		X		X		HOLD	
DHR-43B-02-102294		102294		1105		X		X		HOLD	
DHR-43B-02-102294		102294		1105		X		X		HOLD	
DHR-43C-02-102294		102294		1100		X		X		HOLD	
DHR-23B-13-102294		102294		1130		X		X		HOLD	
DHR-23C-13-102294		102294		1145		X		X		HOLD	
Turnaround Time Requested (TAT) (please circle): Normal Rush		Date		Time		Relinquished by:		Relinquished by:		Date	
(Rush TAT is subject to LLI approval and surcharge.)		10/24/11		1400		Andrew Miller		10/24/11		1400	
Date results are needed:		Date		Time		Relinquished by:		Relinquished by:		Date	
Rush results requested by (please circle): Phone Fax		Date		Time		Relinquished by:		Relinquished by:		Date	
Phone #:		512 788 2717		Fax #:		Relinquished by:		Relinquished by:		Date	
Data Package Options (please circle if requested)		SDG Complete?		Yes No		Relinquished by:		Relinquished by:		Date	
QC Summary GLP Other		Yes No		Yes No		Relinquished by:		Relinquished by:		Date	
Type I (Tier I)		Yes No		Yes No		Relinquished by:		Relinquished by:		Date	
Type II (Tier II)		Yes No		Yes No		Relinquished by:		Relinquished by:		Date	
Type III (NJ Red. Del.)		Yes No		Yes No		Relinquished by:		Relinquished by:		Date	
Type IV (CLP)		Yes No		Yes No		Relinquished by:		Relinquished by:		Date	

Analysis Required / Environmental Services Chain of Custody



For LLI use only
 Acct. # 6948 Sample # 2207714

Please print. Instructions on reverse side correspond with circled numbers.

1 Client: AWD TECHNOLOGISTS Acct. #: _____

Project Name: IRON TON PWSID #: _____

Project Manager: KRIS MCCOSKER P.O. # _____

Sampler: D. MARTINECK Quote #: _____

Name of state where samples were collected: OHIO

For LLI use only

FSC: _____

SCR #: 1062250

Sample Identification	Date Collected			Time Collected	Matrix			Total # of Containers	Analyses Requested	Remarks	Temperature of sample (optional)
	Date	Time	Collected		Soil	Water	Other				
DHR-17C-13-102194	10/21/94	1730		X							
DHR-17B-13-102194	10/21/94	1715		X							
DHR-52A-24-102194	10/21/94	1650		X							
DHR-54B-57-102194	10/21/94	1545		X							
DHR-48A-24-102194	10/21/94	1705		X							
DHR-54C-57-102194	10/21/94	1510		X							
DHR-53A-24-102194	10/21/94	1635		X							
DHR-54A-46-102194	10/21/94	1615		X							
DHR-54A-24-102194	10/21/94	1610		X							
DHR-54B-13-102194	10/21/94	1530		X							

2 Sample Identification

3 Date Collected

4 Matrix

5 Analyses Requested

6 Remarks

For LLI use only

FSC: _____

SCR #: 1062250

7 Turnaround Time Requested (TAT) (please circle): Normal Rush

(Rush TAT is subject to LU approval and surcharge.)

Date results are needed: _____

Rush results requested by (please circle): Phone Fax

Phone #: 412 788 2717 Fax #: _____

Received by: _____

Received by: FED EX

Received by: _____

Received by: _____

Received by: _____

Date	Time	Date	Time
10/21/94	1400	10/21/94	1000
10/21/94	1000	10/21/94	1000
10/21/94	1000	10/21/94	1000
10/21/94	1000	10/21/94	1000
10/21/94	1000	10/21/94	1000

8 Data Package Options (please circle if requested)

QC Summary GLP Other

Type I (Tier I)

Type II (Tier II)

Type III (NJ Red. Del.)

Type IV (CLP)

SDG Complete? Yes No

Site-specific QC required? Yes No

(If yes, indicate QC sample and submit triplicate volume.)

Internal Chain of Custody required? Yes No

Analysis Request/ Environmental Services Chain of Custody



For LUJ use only
Acct. # 6948 Sample # 2206890

Where quality is a science.

Please print. Instructions on reverse side correspond with circled numbers.

1 Client: <u>AUDITECHNOLOGIES INC</u> Project Name: <u>IRONSTON</u> Project Manager: <u>KRIS MCCOSKEY</u> Sampler: <u>D. DODRICK</u> Name of state where samples were collected: <u>OHIO</u>		2 Date Collected: <u>10/21/94</u> Date: <u>10/21/94</u> Time: <u>12:15</u>		3 Matrix <input type="checkbox"/> Potable <input type="checkbox"/> NPDES <input type="checkbox"/> Water <input type="checkbox"/> Soil <input type="checkbox"/> Composite		4 Total # of Containers Other: <u>0240</u>		5 Analyses Requested		6 For LUJ use only FSC: <u>1062250</u> SCR #: <u>1062250</u>					
7 Turnaround Time Requested (TAT) (please circle): Normal Rush Date results are needed: _____ Rush results requested by (please circle): (Phone) _____ Fax _____ Phone # <u>412 788 2717</u> Fax # _____		8 Data Package Options (please circle if requested) QC Summary: <input type="checkbox"/> GLP <input type="checkbox"/> Other Type I (Tier I) Type II (Tier II) Type III (NJ Red. Del.) Type IV (CLP)		SDG Complete? Yes No Site-specific QC required? Yes No (If yes, indicate QC sample and submit triplicate volume.) Internal Chain of Custody required? Yes No		Relinquished by: <u>Andrew Miller</u> Relinquished by: <u>[Signature]</u> Relinquished by: _____ Relinquished by: _____		Date/Time Date/Time Date/Time Date/Time Date/Time		Received by: Received by: <u>FEDER</u> Received by: _____ Received by: _____		Date/Time Date/Time Date/Time Date/Time Date/Time			
DHR-53C-911-102194 DHR-53C-79-102194 DHR-53B-79-102194 DHR-53B-57-102194 DHR-53B-35-102194 DHR-53C-57-102194 DHR-53C-13-102194 DHR-53B-13-102194 DHR-53A-24-102194 DHR-53A-46-102194		102194 1215 102194 1205 102194 1100 102194 1055 102194 1015 102194 1115 102194 1120 102194 1011 102194 0930 102194 0935		X X X X X X X X X X		X X X X X X X X X X		X X X X X X X X X X		X X X X X X X X X X		X X X X X X X X X X		X X X X X X X X X X	

Analysis Request Environmental Services Chain of Custody



For LLI use only
Acct. # 6948 Sample # 2206890
909
2206930-31

Please print. Instructions on reverse side correspond with circled numbers.

1 Client: <u>ALVO TECHNOLOGIES INC</u> Acct. #: <u>6948</u>		2 Sample Identification		3		4 Matrix		5 Analyses Requested		6 For LLI use only	
Project Name: <u>IAWTON</u>		PWSID #: _____		Date Collected: _____		Time Collected: _____		Total # of Containers		FSC: <u>1062250</u>	
Project Manager: <u>KRIS MCKOSK</u>		PO #: _____		Date Collected: _____		Time Collected: _____		Matrix		Remarks	
Sampler: <u>D. MARTINEK</u>		Quote #: _____		Date Collected: _____		Time Collected: _____		Potable <input type="checkbox"/> NPDES <input type="checkbox"/> Other <input type="checkbox"/>		Temperature of Sample (upon receipt if requested)	
Name of state where samples were collected: <u>OHIO</u>		Date Collected: _____		Date Collected: _____		Date Collected: _____		Composite <input type="checkbox"/> Split <input type="checkbox"/>		Remarks	
Sample Identification		Date Collected		Time Collected		Date Collected		Time Collected		Remarks	
DHR-53C-35-102194		102194		1145		102194		1145		X	
DHR-53C-9H-102194		102194		1215		102194		1215		X	
DHR-51A-24-102094		102094		1730		102094		1730		X	
DHR-49A-24-102094		102094		1630		102094		1630		X	
DHR-51A-46-102094		102094		1740		102094		1740		X	
DHR-8B-46-102094		102094		1155		102094		1155		X	
DHR-49A-46-102094		102094		1620		102094		1620		X	
DHR-11A-46-102094		102094		1410		102094		1410		X	
DHR-11A-24-102094		102094		1355		102094		1355		X	
DHR-8B-68-102094		102094		1205		102094		1205		X	
7 Turnaround Time Requested (TAT) (please circle: Normal Rush)		Date results are needed: _____		Rush results requested by (please circle: Phone Fax)		Phone # <u>412 788 2717</u> Fax # _____		Relinquished by: <u>Andrew Miller</u>		Relinquished by: <u>Andrew Miller</u>	
8 Data Package Options (please circle if requested)		QC Summary		GLP		Other		Site-specific QC required? Yes No		Internal Chain of Custody required? Yes No	
Type I (Tier I)		Type II (Tier II)		Type III (NJ Red. Del.)		Type IV (CLP)		Relinquished by: _____		Relinquished by: _____	
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Analysis Request/ Environmental Services Chain of Custody



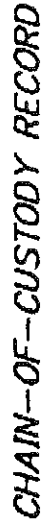
For LLI use only
 Acct. # 6948 Sample # 2206890

9079

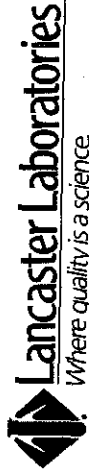
2206930-31

Please print. Instructions on reverse side correspond with circled numbers.

Client: <u>AWD TECHNOLOGIES</u> Acct. #: <u>6948</u> Project Name: <u>IRAWTON</u> PWSID #: _____ Project Manager: <u>KRIS MCCOSKEY</u> P.O. #: _____ Sampler: <u>R. DODRICK</u> Quote #: _____ Name of state where samples were collected: _____		Matrix 4 <input type="checkbox"/> Potable <input type="checkbox"/> NPDES <input type="checkbox"/> Other		Analyses Requested 5 (Temperature of samples upon receipt if requested)		For LLI use only FSC: _____ SCR #: <u>10622SD</u>						
Sample Identification		Date Collected	Time Collected	Composite	Soil	Water	Other	Total # of Containers	Remarks	Received by:	Date	Time
DHR-EB-02-102094	102094/145	X	X	X	X	X	X	X	HOLD	Received by:	Date	Time
DHR-EB-24-102094	102094/1215	X	X	X	X	X	X	X	HOLD	Received by:	Date	Time
DHR-EC-46-102094	102094/1020	X	X	X	X	X	X	X	HOLD	Received by:	Date	Time
DHR-ED-46-102094	102094/0945	X	X	X	X	X	X	X	HOLD	Received by:	Date	Time
DHR-EC-24-102094	102094/1010	X	X	X	X	X	X	X	HOLD	Received by:	Date	Time
DHR-46A-24-102094	102094/1455	X	X	X	X	X	X	X	HOLD	Received by:	Date	Time
DHR-EC-02-102094	102094/1000	X	X	X	X	X	X	X	HOLD	Received by:	Date	Time
DHR-ED-68-102094	102094/0955	X	X	X	X	X	X	X	HOLD	Received by:	Date	Time
DHR-EC-68-102094	102094/1040	X	X	X	X	X	X	X	HOLD	Received by:	Date	Time
DHR-53C-13DUP-102194	102194/1120	X	X	X	X	X	X	X	HOLD	Received by:	Date	Time

[illegible]

Analysis Request/ Environmental Services Chain of Custody



For LLI use only

Acct. # 6948 Sample # 2207694-714

Please print. Instructions on reverse side correspond with circled numbers.

Client: AWD TECHNOLOGIES Acct. # _____
 Project Name/ # LABORATORY PWSID # _____
 Project Manager: KRIS MCCOSKE P.O. # _____
 Sampler: D. MARTINECK Quote # _____
 Name of state where samples were collected: OHIO

Sample Identification			Matrix		Analyses Requested		For LLI use only	
Sample ID	Date Collected	Time Collected	Soil	Water	Other	Remarks	FSC	SCR #
DHR-5413-35-102194	10/21/94	1540	X					
DHR-5418-79-102194	10/21/94	1550	X					
DHR-53D-79-102194	10/21/94	1400	X					
DHR-53D-13-102194	10/21/94	1340	X					
DHR-54D-35-102194	10/21/94	1420	X					
DHR-54D-13-102194	10/21/94	1415	X					
DHR-54C-79-102194	10/21/94	1515	X					
DHR-54D-79-102194	10/21/94	1435	X					
DHR-53D-35-102194	10/21/94	1345	X					
DHR-54D-57-102194	10/21/94	1430	X					

Turnaround Time Requested (TAT) (please circle): Normal Rush _____
 (Rush TAT is subject to LLI approval and surcharge.) PER CONTRACT
 Date results are needed: _____
 Rush results requested by (please circle): Phone Fax _____
 Phone #: 412 788 2717 Fax #: _____

Data Package Options (please circle if requested)

QC Summary	GLP	SDG Complete?	Yes	No
Type I (Tier I)	Other	Site-specific QC required?	Yes	No
Type II (Tier II)		(If yes, indicate QC sample and submit triplicate volume.)		
Type III (NJ Red. Del.)		Internal Chain of Custody required?	Yes	No
Type IV (CLP)				

Relinquished by: Andrew Miller **Received by:** _____
 Date: 10/21/94 Time: 1400 Date: _____ Time: _____
 Relinquished by: [Signature] Received by: _____
 Date: 10/21/94 Time: 1600 Date: _____ Time: _____
 Relinquished by: _____ Received by: _____
 Date: _____ Time: _____ Date: _____ Time: _____
 Relinquished by: _____ Received by: _____
 Date: _____ Time: _____ Date: _____ Time: _____

Analysis Request Environmental Services Chain of Custody



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Acct. # 6948 Sample # 2263738-61

Please print. Instructions on reverse side correspond with circled numbers.

1 Client: <u>AWDTECHNOLOGIES</u> Acct. # _____ Project Name/#: <u>IRONTON</u> PWSID #: _____ Project Manager: <u>KRIS MCCOSKEY</u> P.O. # _____ Sampler: <u>D. WARTNICK</u> Quote #: _____ Name of state where samples were collected: _____				2 Sample Identification <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Date Collected</th> <th>Time Collected</th> </tr> </thead> <tbody> <tr><td>DHR-BG1-02-102294</td><td>10/22/94</td><td>1425</td></tr> <tr><td>DHR-BG1-24-102294</td><td>10/22/94</td><td>1430</td></tr> <tr><td>DHR-BG1-46-102294</td><td>10/22/94</td><td>1435</td></tr> <tr><td>DHR-BG1-68-102294</td><td>10/22/94</td><td>1440</td></tr> <tr><td>DHR-BG2-02-102294</td><td>10/22/94</td><td>1450</td></tr> <tr><td>DHR-BG2-24-102294</td><td>10/22/94</td><td>1455</td></tr> <tr><td>DHR-BG2-46-102294</td><td>10/22/94</td><td>1500</td></tr> <tr><td>DHR-BG2-68-102294</td><td>10/22/94</td><td>1505</td></tr> <tr><td>DHR-BG3-02-102294</td><td>10/22/94</td><td>1510</td></tr> <tr><td>DHR-BG3-24-102294</td><td>10/22/94</td><td>1515</td></tr> </tbody> </table>		Sample ID	Date Collected	Time Collected	DHR-BG1-02-102294	10/22/94	1425	DHR-BG1-24-102294	10/22/94	1430	DHR-BG1-46-102294	10/22/94	1435	DHR-BG1-68-102294	10/22/94	1440	DHR-BG2-02-102294	10/22/94	1450	DHR-BG2-24-102294	10/22/94	1455	DHR-BG2-46-102294	10/22/94	1500	DHR-BG2-68-102294	10/22/94	1505	DHR-BG3-02-102294	10/22/94	1510	DHR-BG3-24-102294	10/22/94	1515	3 Matrix <table border="1"> <thead> <tr> <th>Matrix</th> <th>Grab</th> <th>Composite</th> </tr> </thead> <tbody> <tr><td>Water</td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr> <tr><td>Other</td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr> </tbody> </table>		Matrix	Grab	Composite	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Other	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4 Total # of Containers <table border="1"> <thead> <tr> <th>Water</th> <th>Other</th> </tr> </thead> <tbody> <tr><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td></tr> </tbody> </table>		Water	Other	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5 Analyses Requested FSC: _____ SCR #: <u>1062280</u>		6 Remarks <u>SAMPLE TUBS</u> " " " " " " " " " " " " " " " " " "	
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DHR-BG2-02-102294	10/22/94	1450																																																																											
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Analysis Request/ Environmental Services Chain of Custody



Lancaster Laboratories

Where quality is a science

For LLI use only

Acct. # 6948

Sample # 2207738-61

Please print. Instructions on reverse side correspond with circled numbers.

1 Client: <u>AWD TECHNOLOGIES</u> Project Name: <u>IRONTON</u> Project Manager: <u>KRIS W. COSKIN</u> Sampler: <u>D. MARTINECK</u> Name of state where samples were collected: _____		2 <table border="1"> <thead> <tr> <th>Sample Identification</th> <th>Date Collected</th> <th>Time Collected</th> </tr> </thead> <tbody> <tr> <td>DHR-BG3-46-102294</td> <td>10/22/94</td> <td>1520</td> </tr> <tr> <td>DHR-BG3-68-102294</td> <td>10/22/94</td> <td>1535</td> </tr> <tr> <td>DHR-FBLANK 1-102294</td> <td>10/22/94</td> <td>1630</td> </tr> </tbody> </table>		Sample Identification	Date Collected	Time Collected	DHR-BG3-46-102294	10/22/94	1520	DHR-BG3-68-102294	10/22/94	1535	DHR-FBLANK 1-102294	10/22/94	1630	3 <table border="1"> <thead> <tr> <th>Matrix</th> <th>Water</th> <th>Soil</th> <th>Composite</th> <th>Total # of Containers</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> Potable</td> <td><input type="checkbox"/> Potable</td> <td><input type="checkbox"/> Potable</td> <td><input type="checkbox"/> Potable</td> <td>1</td> </tr> <tr> <td><input type="checkbox"/> NPDES</td> <td><input type="checkbox"/> NPDES</td> <td><input type="checkbox"/> NPDES</td> <td><input type="checkbox"/> NPDES</td> <td>1</td> </tr> <tr> <td><input type="checkbox"/> Other</td> <td><input type="checkbox"/> Other</td> <td><input type="checkbox"/> Other</td> <td><input type="checkbox"/> Other</td> <td>1</td> </tr> </tbody> </table>		Matrix	Water	Soil	Composite	Total # of Containers	<input type="checkbox"/> Potable	<input type="checkbox"/> Potable	<input type="checkbox"/> Potable	<input type="checkbox"/> Potable	1	<input type="checkbox"/> NPDES	<input type="checkbox"/> NPDES	<input type="checkbox"/> NPDES	<input type="checkbox"/> NPDES	1	<input type="checkbox"/> Other	<input type="checkbox"/> Other	<input type="checkbox"/> Other	<input type="checkbox"/> Other	1	4 Analysis Requested Date: <u>10/24/94</u>		5 For LLI use only FSC: _____ SCR #: <u>10102230</u>		6 Remarks <u>Sample Tube</u>	
Sample Identification	Date Collected	Time Collected																																									
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APPENDIX D

DATA VALIDATION LETTERS



A Subsidiary of
The Dow Chemical Company

PGH-94-CDY-1257

DATE January 10, 1995

TO Mr. Kristian Macoskey
Dow Environmental, Inc.
Penn Center West, Building 3, Suite 300
Pittsburgh, Pennsylvania

FROM Cheryl Young
Dow Environmental, Inc.

SUBJECT Data Validation of:
Volatile Organic Chemicals and Barium

Re: The Dow Chemical Company
Dow Hanging Rock - Ironton, Ohio

Lancaster Laboratories Sample Numbers 2206890-2206909

SDG#: IRN01

<u>Samples:</u>	DHR-8C-46-102094	DHR-53B-35-102194
	DHR-8C-24-102094	DHR-53C-57-102194
	DHR-46A-24-102094	DHR-53B-13-102194
	DHR-8C-02-102094	DHR-53A-24-102194
	DHR-53C-13-102194	DHR-53A-46-102194
	DHR-53C-13DUP-102194	DHR-53C-35-102194
	DHR-53C-91-102194	DHR-51A-24-102094
	DHR-53C-79-102194	DHR-49A-24-102094
	DHR-53B-79-102194	DHR-51A-46-102094
	DHR-53B-57-102194	DHR-49A-46-102094

Field Duplicates: Sample DHR-53C-13DUP-102194 is a field duplicate of sample DHR-53C-13-102194.

Overview

This set of samples collected on October 20 and 21, 1994 contains twenty (20) soil samples, including one field duplicate pair. Samples were analyzed for volatile organic chemicals by U.S. EPA SW-846 Method 8240A and Barium using Method 6010A. The percent moisture was determined by using modified Method 160.3 for each environmental sample.

AWD Technologies, Inc.

Penn Center West Building III Suite 300 Pittsburgh Pennsylvania 15276 Telephone 412 788 2717 Fax 412 788 1316

Summary

All compounds were successfully analyzed in all samples. The organic analytical data were evaluated by the following quality assurance/quality control (QA/QC) parameters where applicable: holding times, initial and continuing calibrations, system monitoring compound/surrogate spike recoveries, method blanks, field duplicates, matrix spike/matrix spike duplicates (MS/MSDs), analytical sequence, compound identification and quantitation, and transcription. Validated sample analysis results are listed on the attached data summary form. Areas of concern with respect to data quality and usability are discussed below.

The inorganic analytical data were evaluated by the following QA/QC parameters where applicable: technical holding times and preservation, laboratory blanks, matrix spike recoveries, laboratory duplicates, laboratory control samples, field QC, and transcription. The data are described in the following sections according to the method of analysis and the compliance of the QA/QC information reported in the data package. Validated sample analysis results are listed on the attached data summary form. Areas of concern with respect to data quality and usability are discussed below.

Minor Issues

Blank contamination of barium was identified in laboratory blanks. All barium results were greater than five times the greatest amount of contamination. Therefore, qualification was not indicated.

Surrogate recoveries were greater than quality control limits in samples DHR-53B-79-102194 and DHR-53B-57-102194. All associated results greater than the CRQL were qualified "J", estimated. Associated results less than the CRQL were not qualified.

Surrogate recoveries were less than quality control limits in samples DHR-51A-46-102094 and the dilution of sample DHR-53A-46-102194. Positive associated results were qualified "J", estimated. Non-detected associated results were qualified "UJ", estimated. Please note that only the ethylbenzene and styrene results are affected in sample DHR-53A-46-102194.

The percent recoveries (%Rs) and the relative percent differences (RPDs) of ethylbenzene and styrene were outside of quality control limits in matrix spike/matrix spike duplicate samples. Associated data were not qualified because qualification of data is not based on MS/MSD criteria alone.

PGH-94-CDY-1257
Mr. Kristian Macoskey
Dow Environmental, Inc.
January 10, 1995 - Page 3

Comparisons of the field duplicate pair DHR-53C-13-102194 and DHR-53C-13Dup-102194 were outside of quality control limits for ethylbenzene and styrene. Associated results were qualified "J", estimated.

Notes

Please note that results for sample dilutions have been reported on the analysis reports produced by the laboratory.

Samples DHR-53C-91-102194 and DHR-53B-79-102194 were diluted (1:10) for the volatile analysis.

Sample DHR-53C-79-102194 was diluted (1:10 and 1:20) for the volatile analysis.

Sample DHR-53B-35-102194 was diluted (1:50) for the volatile analysis.

Sample DHR-49A-46-102094 was diluted (1:4) for the volatile analysis.

The laboratory reported that the medium soil method was used for samples DHR-53C-91-102194, DHR-53C-79-102194, DHR-53B-79-102194, DHR-53B-57-102194, DHR-51A-46-102094, and DHR-49A-46-102094 due to the high level of target compounds. The quantitation limits were raised accordingly.

The laboratory reported that quantitation limits for DHR-53A-46-102194 were raised due to the dilution needed to bring target compounds into the calibration of the system.

The laboratory reported that a second ion quantitation was performed on 4-bromofluorobenzene in DHR-53C-91-102194 and DHR-53B-57-102194 by using m/z 174 instead of m/z 95 due to interference with the primary ion.

PGH-94-CDY-1257
Mr. Kristian Macoskey
Dow Environmental, Inc.
January 10, 1995 - Page 4

Information Regarding Report Content

Attachments:

1. Glossary of data qualifier codes.
2. Data Summary. This may include:
 - a) All positive results with qualifier codes, if applicable.
 - b) All estimated detection limits qualified with UJ.
3. Appendix A - Results as Reported by the Laboratory.
4. Appendix B - Support Documentation includes details to support the statements made in this report.

GLOSSARY OF DATA QUALIFIER CODES

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds)

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

(NO CODE) = Confirmed identification.

R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. The result is unusable.

CODES RELATED TO QUANTITATION

(can be used for positive results and sample quantitation limits)

J = Analyte present. Reported value may not be accurate or precise.

UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

DATA SUMMARY

DOW ENVIRONMENTAL, INC.
DOW-HANGING ROCK
IRONTON - GRAB SOIL SAMPLES / SDG# IRNO1
DATA SUMMARY

COMPOUND	DHR-8C-46-102094	DHR-8C-24-102094	DHR-46A-24-102094	DHR-8C-02-102094	DHR-53C-91-102194	DHR-53C-79-102194	DHR-53B-79-102194
Acrylonitrile (ug/kg)	< 130	< 120	< 120	< 110	< 170,000	< 160,000	< 160,000
Methylene Chloride (ug/kg)	< 6	< 6	< 6	< 6	< 8,100	< 7,900	< 7,900
Ethylbenzene (ug/kg)	< 6	< 6	23	< 6	170,000	520,000	210,000 J
Styrene (ug/kg)	< 6	< 6	14	< 6	54,000	200,000	81,000 J
Barium (mg/kg)	105	124	73	157	129	160	117
Moisture (% by wt.)	21.5	16.8	17	12.2	22	19.9	19.8

COMPOUND	DHR-53B-57-102194	DHR-53B-35-102194	DHR-53C-57-102194	DHR-53C-13-102194	DHR-53C-13DUP-102194	DHR-53B-13-102194	DHR-53A-24-102194
Acrylonitrile (ug/kg)	< 670,000	< 120	< 120	< 120	< 120	< 120	< 120
Methylene Chloride (ug/kg)	< 33,000	< 6	6	< 6	< 6	< 6	< 6
Ethylbenzene (ug/kg)	1,400,000 J	33	400	44 J	16	J	10
Styrene (ug/kg)	950,000 J	38	540	110 J	38	J	< 6
Barium (mg/kg)	89	56	313	89	74	66	155
Moisture (% by wt.)	5.6	17.6	17.9	16	16.5	17.9	17.4

COMPOUND	DHR-53A-46-102194	DHR-53C-35-102194	DHR-51A-24-102094	DHR-49A-24-102094	DHR-51A-46-102094	DHR-49A-46-102094
Acrylonitrile (ug/kg)	< 620	< 120	< 16,000	< 120	< 16,000	< 55,000
Methylene Chloride (ug/kg)	< 31	< 6	< 760	< 6	< 780	< 2,700
Ethylbenzene (ug/kg)	2,200 J	160	17,000	550	22,000 J	99,000
Styrene (ug/kg)	3,400 J	280	7,600	350	12,000 J	60,000
Barium (mg/kg)	120	83	69	118	95	100
Moisture (% by wt.)	19.7	16.5	17.1	19.6	18.9	9

APPENDIX A

RESULTS AS REPORTED BY THE LABORATORY



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Page: 1 of 3

LLI Sample No. SW 2206890

Collected: 10/20/94 at 10:20 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-8C-46-102094 Grab Soil Sample
Ironton

8C-46 SDG#: IRN01-01

Account No: D6948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	82.1	9.8	mg/kg	105.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	21.5	0.5	% by wt.			

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:30:55 D 0002 20 0 118283 440216
603 25.00 00033600 ASR000



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

25





LLI Sample No. SW 2206890

Collected: 10/20/94 at 10:20 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8C-46-102094 Grab Soil Sample
Ironton

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

8C-46 SDG#: IRN01-01

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 130.	130.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301





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Page: 1 of 3

LLI Sample No. SW 2206891

Collected: 10/20/94 at 10:10 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8C-24-102094 Grab Soil Sample
Ironton

8C-24 SDG#: IRN01-02

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	103.	9.9	mg/kg	124.	12.
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.
0111	Moisture	16.8	0.5	% by wt.		
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc. ATTN: Mr. Kris Macoskey
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:31:07 0 0002 20 0 118283 440216
603 25.00 00033600 ASR000



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Page: 2 of 3

LLI Sample No. SW 2206891

Collected: 10/20/94 at 10:10 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8C-24-102094 Grab Soil Sample
Ironton

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

8C-24 SDG#: IRN01-02

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Page: 1 of 3

LLI Sample No. SW 2206892

Collected: 10/20/94 at 14:55 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-46A-24-102094 Grab Soil Sample
Ironton

46A24 SDG#: IRN01-03

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	60.6	9.9	mg/kg	73.	12.
9001	Styrene	12.	5.	ug/kg	14.	6.
0111	Moisture	17.0	0.5	% by wt.		
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:31:19 D 0002 20 0 118283 440216
603 25.00 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Continuation of LLI report LLI-2206892





LLI Sample No. SW 2206892

Collected: 10/20/94 at 14:55 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-46A-24-102094 Grab Soil Sample
Ironton

46A24 SDG#: IRN01-03

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	19.	5.	ug/kg	23.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster Laboratories, Inc.
2425 New Holland Pike
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717-656-2301

For explanation of symbols and abbreviations





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Page: 1 of 3

LLI Sample No. SW 2206893

Collected: 10/20/94 at 10:00 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8C-02-102094 Grab Soil Sample
Ironton

8C-02 SDG#: IRN01-04

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SWB46/8240A)			See Page 2			
1646	Barium	138.	10.	mg/kg	157.	11.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	12.2	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

1 COPY TO AWD Technologies, Inc.
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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:31:29 D 0002 20 D 118283 440216
603 25.00 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

31



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster PA 17601-5994
717-656-2301

See back of report for explanation of symbols and abbreviations





LLI Sample No. SW 2206893

Collected: 10/20/94 at 10:00 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8C-02-102094 Grab Soil Sample
Ironton

8C-02 SDG#: IRN01-04

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/B240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 110.	110.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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2425 New Holland Pike
Lancaster, PA 17601-5394
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Page: 1 of 3

LLI Sample No. SW 2206894

Collected: 10/21/94 at 11:20 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-53C-13DUP-102194 Grab Soil Sample
Ironton

53C13 SDG#: IRN01-05

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1D61-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED				DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS		RESULTS	LIMIT OF QUANTITATION	UNITS
1177	Purgeables (SWB46/8240A)			See Page 2				
1646	Barium	62.	10.	mg/kg		74.	12.	
9001	Styrene	32.	5.	ug/kg		38.	6.	
0111	Moisture	16.5	0.5	% by wt.				
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

1 COPY TO AWD Technologies, Inc.
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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:31:40 D 0002 20 0 118283 440216
603 25.00 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Explanation of symbols and abbreviations





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Page: 2 of 3

LLI Sample No. SW 2206894

Collected: 10/21/94 at 11:20 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53C-13DUP-102194 Grab Soil Sample
Ironton

53C13 SDG#: IRN01-05

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/B240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	13.	5.	ug/kg	16.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pk
Lancaster, PA 17601-5994
717-656-2301

34





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Page: 1 of 3

LLI Sample No. SW 2206895

Collected: 10/21/94 at 12:15 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53C-911-102194 Grab Soil Sample
Ironton

53C91 SDG#: IRN01-06

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	101.	9.5	mg/kg	129.	12.
9001	Styrene	42,000.	6,300.	ug/kg	54,000.	8,100.
0111	Moisture	22.0	0.5	% by wt.		
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.					

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:31:51 D 0002 20 0 118283 440216
603 25.00 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

35





LLI Sample No. SW 2206895

Collected: 10/21/94 at 12:15 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-53C-911-102194 Grab Soil Sample
Ironton

53C91 SDG#: IRN01-06

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

35C91 SUG#: 1RNU1-08

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	UNITS
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 130,000.	130,000.	ug/kg	< 170,000.	170,000.	
3440	Methylene Chloride	< 6,300.	6,300.	ug/kg	< 8,100.	8,100.	
3458	Ethylbenzene	130,000.	6,300.	ug/kg	170,000.	8,100.	

The GC/MS volatile analysis was performed according to the medium level

The GC/MS volatile analysis was performed according to the medium level soil method due to the level of target compounds. The quantitation limits were therefore raised.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster PA 17601-5994
717-656-2301





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Page: 1 of 3

LLI Sample No. SW 2206896

Collected: 10/21/94 at 12:05 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53C-79-102194 Grab Soil Sample
Ironton

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

53C79 SDG#: IRN01-07

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/824DA)			See Page 2			
1646	Barium	128.	9.5	mg/kg	160.	12.	
9001	Styrene	160,000.	6,300.	ug/kg	200,000.	7,900.	
D111	Moisture	19.9	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostettler at (717) 656-2301
04:32:02 D 0002 20 D 118283 440216
603 25.D0 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-6994
717-656-2301

For an explanation of symbols and abbreviations, see page 2.



37



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Page: 2 of 3

LLI Sample No. SW 2206896
Collected: 10/21/94 at 12:05 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-53C-79-102194 Grab Soil Sample
Ironton

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

53C79 SDG#: IRN01-07

AS RECEIVED

DRY WEIGHT

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
3439	Acrylonitrile	< 130,000.	130,000.	ug/kg	< 160,000.	160,000.	
3440	Methylene Chloride	< 6,300.	6,300.	ug/kg	< 7,900.	7,900.	
3458	Ethylbenzene	420,000.	6,300.	ug/kg	520,000.	7,900.	

Purgeables (SW846/8240A)

The GC/MS volatile analysis was performed according to the medium level soil method due to the level of target compounds. The quantitation limits were therefore raised.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

For an explanation of symbols and abbreviations, see page 1 of this report.





LLI Sample No. SW 2206897

Collected: 10/21/94 at 11:00 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95DHR-538-79-102194 Grab Soil Sample
Ironton

53879 SDG#: IRN01-08

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	94.1	9.7	mg/kg	117.	12.	
9001	Styrene	65,000.	6,300.	ug/kg	81,000.	7,900.	
0111	Moisture	19.8	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:32:12 D 0002 20 0 118283 440216
603 25.00 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Page: 2 of 3

LLI Sample No. SW 2206897

Collected: 10/21/94 at 11:00 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-538-79-102194 Grab Soil Sample
Ironton

53879 SOG#: IRN01-08

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.D. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 130,000.	130,000.	ug/kg	< 160,000.	160,000.	
3440	Methylene Chloride	< 6,300.	6,300.	ug/kg	< 7,900.	7,900.	
3458	Ethylbenzene	170,000.	6,300.	ug/kg	210,000.	7,900.	

The GC/MS volatile analysis was performed according to the medium level soil method due to the level of target compounds. The quantitation limits were therefore raised.

Questions? Contact your Client Services Representative
Eileen R. Hosterler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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2425 New Holland Pike
Lancaster PA 17601-5994
717-656-2301





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Page: 1 of 3

LLI Sample No. SW 2206898

Collected: 10/21/94 at 10:55 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-538-57-102194 Grab Soil Sample
Ironton

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

53857 SDG#: IRN01-09

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/B240A)			See Page 2			
1646	Barium	84.4	9.7	mg/kg	89.	10.	
90D1	Styrene	900,000.	31,000.	ug/kg	950,000.	33,000.	
0111	Moisture	5.6	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc. ATTN: Mr. Kris Macoskey
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:32:23 0 0002 20 0 118283 440216
603 25.00 00033600 ASR000



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Page: 2 of 3

LLI Sample No. SW 2206898

Collected: 10/21/94 at 10:55 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53B-57-102194 Grab Soil Sample
Ironton

53B57 SDG#: IRN01-09

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 630,000.	630,000.	ug/kg	< 670,000.	670,000.	
3440	Methylene Chloride	< 31,000.	31,000.	ug/kg	< 33,000.	33,000.	
3458	Ethylbenzene	1,300,000.	31,000.	ug/kg	1,400,000.	33,000.	

Poor surrogate recoveries were observed for the GC/MS volatile fraction due to the dilution needed to perform the analysis.

The GC/MS volatile analysis was performed according to the medium level soil method due to the level of target compounds. The quantitation limits were therefore raised.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster, PA 17601-5394
717-656-2301





LLI Sample No. SW 2206899
Collected: 10/21/94 at 10:15 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

OHR-53B-35-102194 Grab Soil Sample
Ironton

53B35 SDG#: IRN01-10

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
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CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	46.0	9.8	mg/kg	56.	12.	
9001	Styrene	31.	5.	ug/kg	38.	6.	
0111	Moisture	17.6	0.5	% by wt.			

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:32:34 D 0002 20 0 -118283 440216
603 25.00 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-9334
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Page: 2 of 3

LLI Sample No. SW 2206899

Collected: 10/21/94 at 10:15 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-538-35-102194 Grab Soil Sample
Ironton

53835 SOG#: IRN01-10

Account No: 06948
 AWD Technologies, Inc.
 Building III
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 Pittsburgh, PA 15276

P.O. SC-94-1061-COM
 Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/B240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	27.	5.	ug/kg	33.	6.	

Questions? Contact your Client Services Representative
 Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
 Michele McClarin, B.A.
 Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
 2425 New Holland Pike
 Lancaster, PA 17601-5394
 717-656-2301

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Page: 1 of 3

LLI Sample No. SW 2206900

Collected: 10/21/94 at 11:15 by DH

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53C-57-102194 Grab Soil Sample
Ironton

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

53C57 SDG#: IRN01-11

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	257.	9.8	mg/kg	313.	12.	
9001	Styrene	440.	5.	ug/kg	540.	6.	
0111	Moisture	17.9	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:32:44 D 0002 20 0 118283 440216
603 25.00 00033600 ASR000



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
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Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Page: 2 of 3

LLI Sample No. SW 2206900

Collected: 10/21/94 at 11:15 by DM

Submitted: 10/24/94 Reported: 11/14/94

Oiscard: 1/14/95

DHR-53C-57-102194 Grab Soil Sample
Ironton

53C57 SDG#: IRN01-11

Account No: 06948
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Pittsburgh, PA 15276

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		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	5.	5.	ug/kg	6.	6.
3458	Ethylbenzene	330.	5.	ug/kg	400.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster Laboratories, Inc.
2425 New Holland Pike
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717-656-2301

For a complete explanation of symbols and abbreviations...





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Page: 1 of 3

LLI Sample No. SW 2206901

Collected: 10/21/94 at 11:20 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53C-13-102194 Grab Soil Sample
Ironton

Account No: 06948

AWD Technologies, Inc.

Building 111

Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

C1310 SDG#: IRN01-12

CAT NO.	ANALYSIS NAME	AS RECEIVED				DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS		RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	74.	10.	mg/kg		89.	12.
9001	Styrene	91.	5.	ug/kg		110.	6.
0111	Moisture	16.0	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:32:54 D 0002 20 0 118283 440216
603 25.00 00033600 ASR000Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS VolatilesLancaster Laboratories, Inc.
2425 New Holland Pkwy
Lancaster, PA 17601-5994
717-656-2301

For explanation of symbols and abbreviations...



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Page: 2 of 3

LLI Sample No. SW 2206901
Collected: 10/21/94 at 11:20 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-53C-13-102194 Grab Soil Sample
Ironton

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.D. SC-94-1061-COM
Rel.

C1310 SDG#: IRN01-12

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	37.	5.	ug/kg	44.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



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Lancaster, PA 17601-5394
717-656-2301





LLI Sample No. SW 2206902

Collected: 10/21/94 at 10:11 by OM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95DHR-538-13-102194 Grab Soil Sample
Ironton

53813 SDG#: IRN01-13

Account No: 06948
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		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	53.9	9.9	mg/kg	66.	12.	
9001	Styrene	72.	5.	ug/kg	88.	6.	
0111	Moisture	17.9	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
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603 25.00 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster, PA 17601-5944
717-656-2301





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LLI Sample No. SW 2206902

Collected: 10/21/94 at 10:11 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53B-13-102194 Grab Soil Sample
Ironton

53B13 SDG#: IRN01-13

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

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		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	62.	5.	ug/kg	76.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster, PA 17601-5994
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LLI Sample No. SW 2206903

Collected: 10/21/94 at 09:30 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53A-24-102194 Grab Soil Sample
Ironton

Account No: 06948
 AWD Technologies, Inc.
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 Pittsburgh, PA 15276

P.O. SC-94-1061-COM
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53A24 SDG#: IRN01-14

CAT NO.	ANALYSIS NAME	AS RECEIVED			UNITS	DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION			RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SWB46/8240A)				See Page 2		
1646	Barium	128.	9.9		mg/kg	155.	12.
9001	Styrene	< 5.	5.		ug/kg	< 6.	6.
0111	Moisture	17.4	0.5		% by wt.		
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
 Eileen R. Hostetler at (717) 656-2301
 04:33:14 D 0002 20 0 118283 440216
 603 25.00 00033600 ASR000

Respectfully Submitted
 Michele McClarin, B.A.
 Group Leader, GC/MS Volatiles

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 2425 New Holland Pike
 Lancaster, PA 17601-5994
 717-656-2301





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LLI Sample No. SW 2206903

Collected: 10/21/94 at 09:30 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53A-24-102194 Grab Soil Sample
Ironton

53A24 SDG#: IRN01-14

Account No: 06948
 AWD Technologies, Inc.
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P.O. SC-94-1061-COM
 Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	8.	5.	ug/kg	10.	6.

Questions? Contact your Client Services Representative
 Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
 Michele McClarin, B.A.
 Group Leader, GC/MS Volatiles



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 717-656-2301

Explanation of symbols and codes, if any.





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Page: 1 of 3

LLI Sample No. SW 2206904

Collected: 10/21/94 at 09:35 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-53A-46-102194 Grab Soil Sample
Ironton

53A46 SDG#: IRN01-15

Account No: 06948
AWD Technologies, Inc.
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Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	96.7	9.8	mg/kg	120.	12.
9001	Styrene	2,700.	25.	ug/kg	3,400.	31.
0111	Moisture	19.7	0.5	% by wt.		
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.					

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:33:25 D 0002 20 0 118283 440216
603 25.00 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster, PA 17601-5301
(717) 656-2301





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Page: 2 of 3

LLI Sample No. SW 2206904

Collected: 10/21/94 at 09:35 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-53A-46-102194 Grab Soil Sample
Ironton

53A46 SDG#: IRN01-15

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-CDM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 500.	500.	ug/kg	< 620.	620.
3440	Methylene Chloride	< 25.	25.	ug/kg	< 31.	31.
3458	Ethylbenzene	1,800.	25.	ug/kg	2,200.	31.

The quantitation limits for the GC/MS volatile compounds were raised because sample dilution was necessary to bring target compounds into the calibration range of the system.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster Laboratories Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Lab. # 01010001-0001-0001





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LLI Sample No. SW 2206905

Collected: 10/21/94 at 11:45 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53C-35-102194 Grab Soil Sample
Ironton

53C35 SDG#: IRN01-16

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	69.3	9.7	mg/kg	83.	12.	
9001	Styrene	230.	5.	ug/kg	280.	6.	
0111	Moisture	16.5	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:33:35 D 0002 20 0 118283 440216
603 25.00 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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LLI Sample No. SW 2206905

Collected: 10/21/94 at 11:45 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53C-35-102194 Grab Soil Sample
Ironton

Account No: 06948

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P.O. SC-94-1061-COM

Rel.

53C35 SDG#: IRN01-16

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	130.	5.	ug/kg	160.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

For a complete explanation of symbols and abbreviations...





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LLI Sample No. SW 2206906

Collected: 10/20/94 at 17:30 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-51A-24-102094 Grab Soil Sample
Ironton

Account No: 06948
 AWD Technologies, Inc.
 Building III
 Penn Center West, Suite 300
 Pittsburgh, PA 15276

P.O. SC-94-1061-COM
 Rel.

51A24 SDG#: IRN01-17

CAT NO.	ANALYSIS NAME	AS RECEIVED			UNITS	DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION			RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/B240A)				See Page 2		
1646	Barium	57.1	9.9		mg/kg	69.	12.
9001	Styrene	6,300.	630.		ug/kg	7,600.	760.
0111	Moisture	17.1	0.5		% by wt.		
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

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 1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
 Eileen R. Hostetler at (717) 656-2301
 04:33:46 D 0002 20 0 118283 440216
 603 25.00 00033600 ASR000

Respectfully Submitted
 Michele McClarin, B.A.
 Group Leader, GC/MS Volatiles



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 2425 New Holland Pike
 Lancaster PA 17601-5994
 717-656-2301

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LLI Sample No. SW 2206906

Collected: 10/20/94 at 17:30 by DH

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-51A-24-102094 Grab Soil Sample
Ironton

51A24 SDG#: IRN01-17

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 13,000.	13,000.	ug/kg	< 16,000.	16,000.	
3440	Methylene Chloride	< 630.	630.	ug/kg	< 760.	760.	
3458	Ethylbenzene	14,000.	630.	ug/kg	17,000.	760.	

The GC/MS volatile analysis was performed according to the medium level soil method due to the level of target compounds. The quantitation limits were therefore raised.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5394
717-656-2301





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Where quality is a science.

Page: 1 of 3

LLI Sample No. SW 2206907

Collected: 10/20/94 at 16:30 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-49A-24-102094 Grab Soil Sample
Ironton

49A24 SDG#: IRN01-18

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A1			See Page 2			
1646	Barium	94.8	9.7	mg/kg	118.	12.	
9001	Styrene	280.	5.	ug/kg	350.	6.	
0111	Moisture	19.6	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group.

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:33:56 D 0002 20 D 118283 440216
603 25.00 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301





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Page: 2 of 3

LLI Sample No. SW 2206907

Collected: 10/20/94 at 16:30 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-49A-24-102094 Grab Soil Sample
Ironton

49A24 SDG#: IRN01-18

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1D61-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/B240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	440.	5.	ug/kg	550.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Page: 1 of 3

LLI Sample No. SW 2206908

Collected: 10/20/94 at 17:40 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-51A-46-102094 Grab Soil Sample
Ironton

51A46 SDG#: IRN01-19

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	77.	10.	mg/kg	95.	12.	
9001	Styrene	10,000.	630.	ug/kg	12,000.	780.	
0111	Moisture	18.9	0.5	% by wt.			

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:34:06 D 0002 20 0 118283 440216
603 25.00 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See back of report for explanation of symbols and abbreviations





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Where quality is a science.

Page: 2 of 3

LLI Sample No. SW 2206908

Collected: 10/20/94 at 17:40 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-51A-46-102094 Grab Soil Sample
Ironton

51A46 SDG#: IRN01-19

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 13,000.	13,000.	ug/kg	< 16,000.	16,000.	
3440	Methylene Chloride	< 630.	630.	ug/kg	< 780.	780.	
3458	Ethylbenzene	18,000.	630.	ug/kg	22,000.	780.	

The GC/MS volatile analysis was performed according to the medium level soil method due to the level of target compounds. The quantitation limits were therefore raised.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

For a complete explanation of symbols and abbreviations





LLI Sample No. SW 2206909
Collected: 10/20/94 at 16:20 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-49A-46-102094 Grab Soil Sample
Ironton

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1D61-COM
Rel.

49A46 SDG#: IRN01-20*

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	UNITS
1177	Purgeables (SWB46/824DA)			See Page 2			
1646	Barium	90.9	9.7	mg/kg	100.	11.	
9001	Styrene	55,000.	2,500.	ug/kg	60,000.	2,700.	
0111	Moisture	9.0	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:34:18 D ODD2 20 0 118283 440216
603 25.00 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



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Lancaster, PA 17601-5994
717-656-2301





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Page: 2 of 3

LLI Sample No. SW 2206909

Collected: 10/20/94 at 16:20 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-49A-46-102094 Grab Soil Sample
Ironton

49A46 SDG#: IRN01-20*

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 50,000.	50,000.	ug/kg	< 55,000.	55,000.	
3440	Methylene Chloride	< 2,500.	2,500.	ug/kg	< 2,700.	2,700.	
3458	Ethylbenzene	< 2,500.	2,500.	ug/kg	< 2,700.	2,700.	

The GC/MS volatile analysis was performed according to the medium level soil method due to the level of target compounds. The quantitation limits were therefore raised.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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APPENDIX B
SUPPORT DOCUMENTATION

QUALITY ASSURANCE SUMMARY

BLANKS

Lab Name: LANCASTER LABORATORIES

SDG No.: IRN01

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	1	C	2	C	3	C		C	
Barium	12.3	B	4.8	B	5.4	B	1.9	U			P

QUALITY ASSURANCE SUMMARY

BLANKS

Lab Name: LANCASTER LABORATORIES__

SDG No.: IRN01

Preparation Blank Matrix (soil/water): _SOIL_

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
			1	C	2	C	3	C			
Barium		-	1.9	U		-		-	0.681	B	P

QUALITY ASSURANCE SUMMARY

BLANKS

Lab Name: LANCASTER LABORATORIES

SDG No.: IRN01

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
		1	C	2	C	3	C			
Barium		1.9	U					0.681	B	B



Lancaster Laboratories

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SOIL VOLATILE SURROGATE RECOVERY

2B

LAB NAME: LANCASTER LABS

SDG No: IRN01

LEVEL: MED

	EPA SAMPLE NO.	S1 (DCE) #	S2 (TOL) #	S3 (BFB) #	OTHER	TOT OUT
01	53C91	92	92	102		
02	53C79	97	92	98		
03	53C79DL	97	88	92		
04	53B79	91	86	116		
05	53B57	88	102	169 D		
06	53A46DL	84	83	91		
07	53A46DLMS	90	92	90		
08	53A46DLMSD	99	104	100		
09	51A24	94	91	99		
10	51A46	80	83	89		
11	49A46	86	92	104		
12						
13	LAB QC					
14	VBLKH81	96	95	95		
15	VBLKH10	101	97	101		
16	VBLKH14	107	101	99		
17	VBLKH15	90	94	93		
18	LCSMH04	99	103	105		
19						
20						
21						
22						
23						
24						
25						

				QC LIMITS
S1	(DCE)	=	1,2-Dichloroethane-d4	70 - 121
S2	(TOL)	=	Toluene-d8	84.81 - 117.138
S3	(BFB)	=	4-Bromofluorobenzene	59.74 - 121.113

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

Lancaster Laboratories, Inc.
GC/MS Volatiles Matrix Spike/Spike Duplicate Recoveries

Unspiked: ^HCR16
53A46DL 2206904
Method: 1177
Instrument: HP03974

+SPECIALS

Matrix spike: ^HN306
53A46DLMS 2206904
Matrix/Level: SM
Dilution Factor: 1.0

Spike Duplicate: ^HN307
53A46DLMSD2206904
Batch: H942992AB
% Moisture: 20

COMPOUND NAME	SPIKE LEVEL	US CDNC UG/KG	MS CONC UG/KG	MSD CONC UG/KG	MS REC %	MSD REC %	RPD %	RANGE LOWER-UPPER	IN SPEC
Chloromethane	3125.00	0.00	5240.76	1684.53	168	54	103	1-273	YES
Vinyl Chloride	3125.00	0.00	5982.91	2132.35	191	68	95	1-251	YES
Bromomethane	3125.00	0.00	6029.40	2569.64	193	82	81	1-242	YES
Chloroethane	3125.00	0.00	5869.83	2194.70	188	70	91	14-230	YES
Trichlorofluoromethane	3125.00	0.00	4695.47	3519.79	150	113	28	17-181	YES
Acrolein	23437.50	0.00	10982.64	6144.31	47	26	58	22-169	YES
1,1-Dichloroethene	3125.00	0.00	2840.00	2627.12	91	84	8	1-234	YES
Acetone	23437.50	0.00	22143.39	21323.87	94	91	3	19-150	YES
Carbon Disulfide	23437.50	0.00	33067.30	28791.73	141	123	14	29-183	YES
Methylene Chloride	3125.00	0.00	4117.27	3986.74	132	128	3	1-221	YES
Acrylonitrile	23437.50	0.00	22158.54	21771.01	94	93	1	51-138	YES
1,1-Dichloroethane	3125.00	0.00	3075.61	2967.60	98	95	3	59-155	YES
1,2-Dichloroethene (total)	6250.00	0.00	6755.89	6702.04	108	107	1	54-156	YES
2-Butanone	23437.50	0.00	25688.13	25875.87	110	110	0	22-167	YES
Chloroform	3125.00	0.00	3019.45	3122.58	97	100	-3	51-138	YES
1,2-Dichloroethane	3125.00	0.00	2942.18	2967.35	94	95	-1	49-155	YES
Vinyl Acetate	15625.00	0.00	15306.76	17353.33	98	111	-12	19-190	YES
1,1,1-Trichloroethane	3125.00	0.00	4155.93	4097.95	133	131	2	52-162	YES
bon Tetrachloride	3125.00	0.00	3119.43	3076.65	100	98	2	70-140	YES
zene	3125.00	0.00	4093.61	3987.09	131	128	2	37-151	YES
Trichloroethene	3125.00	0.00	4256.29	4287.67	136	137	-1	71-157	YES
1,2-Dichloropropane	3125.00	0.00	2955.61	3008.88	94	96	-2	1-210	YES
Bromodichloromethane	3125.00	0.00	2985.25	3034.13	96	97	-1	35-155	YES
2-Chloroethyl Vinyl Ether	3125.00	0.00	3005.40	2598.98	96	83	14	1-305	YES
cis-1,3-Dichloropropene	3125.00	0.00	3474.81	3527.29	111	113	-2	1-227	YES
trans-1,3-Dichloropropene	1187.50	0.00	1243.64	1262.86	105	106	-1	17-183	YES
1,1,2-Trichloroethane	3125.00	0.00	2946.21	3001.60	94	96	-2	52-150	YES
Dibromochloromethane	3125.00	0.00	2924.95	2959.74	94	95	-1	53-149	YES
Bromoform	3125.00	0.00	2825.20	2852.64	90	91	-1	45-169	YES
4-Methyl-2-Pentanone	15625.00	0.00	12942.57	12727.97	83	81	2	50-124	YES
Toluene	3125.00	0.00	3948.40	4018.09	126	128	-2	47-150	YES
Tetrachloroethene	3125.00	0.00	4119.84	4290.86	132	137	-4	64-148	YES
2-Hexanone	15625.00	0.00	14517.80	14288.83	93	91	2	52-140	YES
Chlorobenzene	3125.00	0.00	2994.29	3038.23	96	97	-1	37-160	YES
Ethylbenzene	3125.00	2206.49	24945.39	8406.36	728	198	114	37-162	NO

N/C = Could not calculate

Lab Chronicle: _____ Ent. by _____

_____ Ver. by _____

* %RPD for this compound exceeds method specified limit.

Lancaster Laboratories, Inc.
GC/MS Volatiles Matrix Spike/Spike Duplicate Recoveries

Unspiked: ^HCR16
53A46DL 2206904
Method: 1177 +SPECIALS
Instrument: HP03974

Matrix spike: ^HN306
53A46DLMS 2206904
Matrix/Level: SM
Dilution Factor: 1.0

Spike Duplicate: ^HN3D7
53A46DLMSD2206904
Batch: H942992AB
% Moisture: 20

COMPOUND NAME	SPIKE LEVEL	US CONC UG/KG	MS CONC UG/KG	MSD CONC UG/KG	MS REC %	MSD REC %	RPD %	RANGE LOWER-UPPER	IN SPEC
Xylene (total)	9375.00	0.00	8221.29	11302.78	88	120	-31	61-165	YES
Styrene	3125.00	3341.45	23914.41	9450.58	658	195	108	74-136	NO
1,1,2,2-Tetrachloroethane	3125.00	0.00	3009.88	3441.01	96	110	-14	46-157	YES

N/C = Could not calculate

Lab Chronicle: _____ Ent. by _____

_____ Ver. by _____

* %RPD for this compound exceeds method specified limit.

6/11A
11/2/92

DOW ENVIRONMENTAL, INC.
DOW-HANGING ROCK
IRONTON - GRAB SOIL SAMPLES
FIELD DUPLICATES

COMPOUND	DHR-53C-13-102194	DHR-53C-13DUP-102194	CONTROL LIMIT
Acrylonitrile (ug/kg)	< 120	< 120	+/- 4 X CRQL
Methylene Chloride (ug/kg)	< 6	< 6	+/- 4 X CRQL
Ethylbenzene (ug/kg)	44	16	+/- 4 X CRQL
Styrene (ug/kg)	110	38	+/- 50%
Barium (mg/kg)	89	74	+/- 50%
Moisture (% by wt.)	16	16.5	+/- 50%



A Subsidiary of
The Dow Chemical Company

PGH-95-CDY-0028

DATE January 10, 1995

TO Mr. Kristian Macoskey
Dow Environmental, Inc.
Pittsburgh, Pennsylvania

FROM Cheryl Young
Dow Environmental, Inc.

SUBJECT Data Validation of:
Volatile Organic Chemicals and Barium

Re: The Dow Chemical Company
Dow Hanging Rock - Ironton, Ohio

Lancaster Laboratories Sample Numbers: 2206930-2206931
2207694-2207714

SDG#: IRN02

<u>Samples:</u>	DHR-11A-46-102094	DHR-54A-24-102194
	DHR-11A-24-102094	DHR-54B-13-102194
	DHR-46A-46-102094	DHR-54B-35-102194
	DHR-17C-13-102194	DHR-54C-13-102194
	DHR-17B-13-102194	DHR-54C-13-102194DUP
	DHR-52A-24-102194	DHR-54C-35-102194
	DHR-54B-57-102194	DHR-20C-46-102294
	DHR-48A-24-102194	DHR-20B-02-102294
	DHR-54C-57-102194	DHR-20B-46-102294
	DHR-55A-24-102194	DHR-20C-24-102294
	DHR-54A-46-102194	

Field Duplicates: Sample DHR-54C-13-102194DUP is a field duplicate of sample DHR-54C-13-102194.

Overview

This set of samples collected on October 20, 21, and 22, 1994, containing twenty-one (21) soil samples, including one field duplicate pair, were analyzed for volatile organic chemicals by EPA SW-846 Method 8240 and Barium using Method 6010A. The percent moisture was determined by using modified Method 160.3 for each environmental sample.

AWD Technologies, Inc.

Penn Center West Building III Suite 300 Pittsburgh Pennsylvania 15276 Telephone 412 788 2717 Fax 412 788 1316

Summary

All compounds were successfully analyzed in all samples. The organic analytical data were evaluated by the following quality assurance/quality control (QA/QC) parameters where applicable: holding times, initial and continuing calibrations, system monitoring compound/surrogate spike recoveries, method blanks, field duplicates, matrix spike/matrix spike duplicates (MS/MSDs), laboratory control samples, analytical sequence, compound identification and quantitation, and transcription.

The inorganic analytical data were evaluated by the following quality assurance/quality control (QA/QC) parameters where applicable: technical holding times, initial and continuing calibrations, laboratory blanks, ICP interference check samples, matrix spike/matrix spike duplicate (MS/MSD) recoveries, laboratory duplicates, laboratory control samples, ICP serial dilutions, and transcription.

Validated sample analysis results are listed on the attached data summary form. Areas of concern with respect to data quality and usability are discussed below.

Minor Issues

Blank contamination of barium was identified in laboratory blanks. All barium results were greater than five times the greatest amount of contamination (5.6 ug/l), therefore, no qualification of data was indicated.

The surrogate recovery of 4-Bromofluorobenzene was greater than quality control limits in the dilution of sample DHR-11A-46-102094. All associated volatile results greater than the CRQL, were qualified "J", estimated.

The percent recoveries (%Rs) and the relative percent differences (RPDs) of ethylbenzene and styrene were outside of quality control limits in matrix spike/matrix spike duplicate samples. Associated data were not qualified because qualification of data is not based on MS/MSD criteria alone.

Notes

Please note that results for sample dilutions have been reported on the analysis reports produced by the laboratory.

Sample DHR-46A-46-102094 was diluted for the volatile analysis.

PGH-95-CDY-0028
Mr. Kristian Macoskey
Dow Environmental Inc.
January 10, 1995 - Page 3

Comparisons of the field duplicate samples DHR-54C-13-102194 and DHR-54C-13-102194Dup were within the quality control limits of +/- fifty percent (50%). These comparisons are included in the support documentation section of this report.

The laboratory reported that the medium level soil method was used for sample DHR-11A-46-102094 due to the high level of target compounds. The quantitation limits for this sample were raised accordingly.

The laboratory reported that a secondary ion quantitation was performed on 4-bromofluorobenzene in 11A46 by using m/z 174 instead of m/z 95 due to interference with the primary ion.

Information Regarding Report Content

Attachments:

1. Glossary of data qualifier codes.
2. Data Summary. This may include:
 - a) All positive results with qualifier codes, if applicable.
 - b) All estimated detection limits qualified with UJ.
3. Appendix A - Results as Reported by the Laboratory.
4. Appendix B - Support Documentation includes details to support the statements made in this report.

GLOSSARY OF DATA QUALIFIER CODES

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds)

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

(NO CODE) = Confirmed identification.

R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. The result is unusable.

CODES RELATED TO QUANTITATION

(can be used for positive results and sample quantitation limits)

J = Analyte present. Reported value may not be accurate or precise.

UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

DATA SUMMARY

DOW ENV MENTAL, INC.
DOW - HANGING ROCK
IRONTON - GRAB SOIL SAMPLES / SDG # IRN02-01
DATA SUMMARY

Compound	DHR-11A-46-102094	DHR-11A-24-102094	DHR-46A-46-102094	DHR-17C-13-102194	DHR-17B-13-102194	DHR-52A-24-102194	DHR-54B-57-102194
Acrylonitrile (ug/kg)	< 540,000	< 120	< 120	< 120	< 120	< 120	< 120
Methylene Chloride (ug/kg)	< 27,000	< 6	< 6	< 6	< 6	< 6	9
Ethylbenzene (ug/kg)	570,000 J	8	1,200	< 6	< 6	< 6	< 6
Styrene (ug/kg)	530,000 J	17	320	< 6	< 6	< 6	< 6
Barium (mg/kg)	73	67	103	61	58	71	118
Moisture (% by wt.)	6.8	17.6	17.8	15.9	15.7	17.0	18.0

Compound	DHR-48A-24-102194	DHR-54C-57-102194	DHR-55A-24-102194	DHR-54A-46-102194	DHR-54A-24-102194	DHR-54B-13-102194	DHR-54B-35-102194
Acrylonitrile (ug/kg)	< 120	< 120	< 120	< 120	< 120	< 120	< 120
Methylene Chloride (ug/kg)	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Ethylbenzene (ug/kg)	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Styrene (ug/kg)	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Barium (mg/kg)	61	132	72	98	63	63	83
Moisture (% by wt.)	17.6	17.8	16.9	18.1	17.6	15.6	17.4

Compound	DHR-54C-13-102194	DHR-54C-13-102194DUP	DHR-54C-35-102194	DHR-20C-46-102294	DHR-20B-02-102294	DHR-20B-46-102294	DHR-20C-24-102294
Acrylonitrile (ug/kg)	< 120		< 120	< 120	< 120	< 120	< 120
Methylene Chloride (ug/kg)	< 6		< 6	< 6	< 6	< 6	< 6
Ethylbenzene (ug/kg)	< 6		< 6	< 6	7	28	< 6
Styrene (ug/kg)	< 6		< 6	< 6	< 6	47	< 6
Barium (mg/kg)	58	93	79	113	69	106	83
Moisture (% by wt.)	15.5	15.2	17.1	17.3	16.2	18.5	15.1

APPENDIX A
RESULTS AS REPORTED BY THE LABORATORY



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Page: 1 of 3

LLI Sample No. SW 2206930

Collected: 10/20/94 at 14:10 by DM

Submitted: 10/24/94 Reported: 11/11/94

Discard: 1/11/95

DHR-11A-46-102094 Grab Soil Sample
Ironton

11A46 SDG#: IRN02-01

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED		UNITS	DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION		RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	68.	10.	mg/kg	73.	11.
9001	Styrene	490,000.	25,000.	ug/kg	530,000.	27,000.
D111	Moisture	6.8	0.5	% by wt.		

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
03:26:52 D 0002 2 0 118283 440219
603 25.00 00033600 ASR000



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994

Respectfully Submitted
Michele McClarin, S.A.
Group Leader, GC/MS Volatiles



LLI Sample No. SW 2206930

Collected: 10/20/94 at 14:10 by DM

Submitted: 10/24/94 Reported: 11/11/94
Discard: 1/11/95

DHR-11A-46-102094 Grab Soil Sample
Ironton

11A46 SOG#: IRN02-01

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SWB46/8240A)						
3439	Acrylonitrile	< 500,000.	500,000.	ug/kg	< 540,000.	540,000.
3440	Methylene Chloride	< 25,000.	25,000.	ug/kg	< 27,000.	27,000.
3458	Ethylbenzene	530,000.	25,000.	ug/kg	570,000.	27,000.

Poor surrogate recoveries were observed for the GC/MS volatile fraction due to the dilution needed to perform the analysis.

The GC/MS volatile analysis was performed according to the medium level soil method due to the level of target compounds. The quantitation limits were therefore raised.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, S.A.
Group Leader, GC/MS Volatiles



Analysis Report



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Page: 1 of 3

LLI Sample No. SW 2206931
Collected: 10/20/94 at 13:55 by DM

Submitted: 10/24/94 Reported: 11/11/94
Discard: 1/11/95

DHR-11A-24-102094 Grab Soil Sample
Ironton

11A24 SDG#: IRN02-02

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			UNITS	DRY WEIGHT	
		RESULTS	LIMIT OF	QUANTITATION		RESULTS	LIMIT OF
1177	Purgeables (SW846/8240A)				See Page 2		
1646	Barium	55.2	9.6		mg/kg	67.	12.
9001	Styrene	14.	5.		ug/kg	17.	6.
0111	Moisture	17.6	0.5		% by wt.		

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostettler at (717) 656-2301
03:27:18 D 0002 2 0 118283 440219
603 25.00 00033600 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



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Page: 2 of 3

LLI Sample No. SW 2206931

Collected: 10/20/94 at 13:55 by DM

Submitted: 10/24/94 Reported: 11/11/94

Discard: 1/11/95

DHR-11A-24-102094 Grab Soil Sample
Ironton

11A24 SDG#: IRN02-02

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	7.	5.	ug/kg	8.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pk
Lancaster PA 17601-5994

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



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Page: 1 of 3

LLI Sample No. SW 2207694

Collected: 10/20/94 at 14:45 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-46A-46-102094 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

46A46 SOG#: IRN02-03

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.D. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	84.4	9.5	mg/kg	183	12.
9001	Styrene	260.	5.	ug/kg	320.	6.
0111	Moisture	17.8	0.5	% by wt.		
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.					

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:44:08 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Analysis Report



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Page: 2 of 3

LLI Sample No. SW 2207694

Collected: 10/20/94 at 14:45 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-46A-46-102094 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

46A46 SDG#: IRN02-03

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

AS RECEIVED

CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS
Purgeables (SW046/0240A)				
3439	Acrylonitrile	< 100.	100.	ug/kg
3440	Methylene Chloride	< 5.	5.	ug/kg
3458	Ethylbenzene	960.	5.	ug/kg

DRY WEIGHT

RESULTS	LIMIT OF QUANTITATION
< 120.	120.
< 6.	6.
1,200.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike



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Page: 1 of 3

LLI Sample No. SW 2207695
Collected: 10/21/94 at 17:30 by DNM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-17C-13-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
17C13 SOG#: IRN02-04

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	51.7	9.5	mg/kg	61.	11.
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.
0111	Moisture	15.9	0.5	% by wt.		

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:44:20 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



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Page: 2 of 3

LLI Sample No. SW 2207695

Collected: 10/21/94 at 17:30 by DHM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-17C-13-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

17C13 SDG#: IRN02-04

Account No: 06948
AMD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/B240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5001

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



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Page: 1 of 3

LLI Sample No. SW 2207696

Collected: 10/21/94 at 17:15 by ONM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-17B-13-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
17B13 SDG#: IRN02-05

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	48.8	9.9	mg/kg	58.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	15.7	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:44:30 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations.



* 22
9 13



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Page: 2 of 3

LLI Sample No. SW 2207696

Collected: 10/21/94 at 17:15 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-17B-13-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

17B13 SDG#: IRN02-05

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations.

41



* 22
9 13



LLI Sample No. SW 2207697

Collected: 10/21/94 at 16:50 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-52A-24-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
52A24 SDG#: IRN02-06

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED				DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS		RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/824DA)			See Page 2			
1646	Barium	59.3	9.9	mg/kg		71.	12.
9001	Styrene	< 5.	5.	ug/kg		< 6.	6.
0111	Moisture	17.0	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

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1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:44:42 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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42
22
913



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Page: 2 of 3

LLI Sample No. SW 2207697

Collected: 10/21/94 at 16:50 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-52A-24-102194 Grab Soil Sample

Dow Hanging Rock - Tronton, OH Proj. No. 7015.600
52A24 SOG#: 1RN02-06

Account No: D6948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations.



22
913



LLI Sample No. SW 2207698

Collected: 10/21/94 at 15:45 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54B-57-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
54857 SDG#: IRN02-07

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			UNITS	DRY WEIGHT		
		RESULTS	LIMIT OF	QUANTITATION		RESULTS	LIMIT OF	QUANTITATION
1177	Purgeables (SWB46/B240A)				See Page 2			
1646	Barium	96.8	9.8		mg/kg	118.	12.	
9001	Styrene	< 5.	5.		ug/kg	< 6.	6.	
0111	Moisture	18.0	0.5		% by wt.			

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

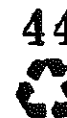
Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:44:51 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





LLI Sample No. SW 2207698

Collected: 10/21/94 at 15:45 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-548-57-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
54857 SOG#: IRN02-07

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	7.	5.	ug/kg	9.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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45



422
513



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Page: 1 of 3

LLI Sample No. SW 2207699

Collected: 10/21/94 at 17:05 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-48A-24-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
48A24 SDG#: IRN02-08

Account No: D6948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SWB46/8240A)			See Page 2			
1646	Barium	50.1	9.5	mg/kg	61.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	17.6	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:45:02 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations

46



*22:
9 13



LLI Sample No. SW 2207699

Collected: 10/21/94 at 17:05 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-48A-24-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

48A24 SDG#: IRN02-08

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SWB46/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations.





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Page: 1 of 3

LLI Sample No. SW 2207700

Collected: 10/21/94 at 15:10 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54C-57-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

54C57 SDG#: IRN02-09

Account No: 06948

AWD Technologies, Inc.

Building 111

Fenn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-94-1061-COM

Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	108.	9.7	mg/kg	132.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	17.8	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

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1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:45:12 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations.



32
313



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Page: 2 of 3

LLI Sample No. SW 2207700

Collected: 10/21/94 at 15:10 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

OHR-54C-57-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
54C57 SDG#: IRN02-09

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.D. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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* 22 *
913



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Page: 1 of 3

LLI Sample No. SW 2207701

Collected: 10/21/94 at 16:35 by ONM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

OHR-55A-24-102194 Grab Soil Sample

Oow Hanging Rock - Ironton, OH Proj. No. 7015.600

55A24 SDG#: IRN02-10

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	59.7	9.7	mg/kg	72.	12.
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.
0111	Moisture	16.9	0.5	% by wt.		
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

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ATTN: Mr. Kris Macoskey

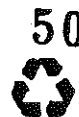
Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:45:23 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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9 11



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Page: 2 of 3

LLI Sample No. SW 2207701

Collected: 10/21/94 at 16:35 by DHM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-55A-24-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
55A24 SDG#: IRN02-10

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
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		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SWB46/B240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
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717-656-2301

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51
20
9 11



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Page: 1 of 3

LLI Sample No. SW 2207702

Collected: 10/21/94 at 16:15 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54A-46-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

54A46 SDG#: IRN02-11

Account No: 06948

AWD Technologies, Inc.

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Penn Center West, Suite 300

Pittsburgh, PA 15276

P.D. SC-94-1061-COM

Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			UNITS	DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION			RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)				See Page 2		
1646	Barium	80.6	9.8		mg/kg	98.	12.
9001	Styrene	< 5.	5.		ug/kg	< 6.	6.
0111	Moisture	18.1	0.5		% by wt.		
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:45:33 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
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9 13 9



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Page: 2 of 3

LLI Sample No. SW 2207702

Collected: 10/21/94 at 16:15 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54A-46-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

54A46 SDG#: IRN02-11

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acetonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Acetylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Styrene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
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* 23
9 *

53



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Page: 1 of 3

LLI Sample No. SW 2207703

Collected: 10/21/94 at 16:10 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54A-24-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

S4A24 SDG#: IRN02-12

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
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CAT NO.	ANALYSIS NAME	AS RECEIVED				DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS		RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2				
1646	Barium	52.1	9.7	mg/kg		63.	12.	
9001	Styrene	< 5.	5.	ug/kg		< 6.	6.	
0111	Moisture	17.6	0.5	% by wt.				

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:45:44 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
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717-656-2301

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* 22
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Page: 2 of 3

LLI Sample No. SW 2207703

Collected: 10/21/94 at 16:10 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54A-24-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
54A24 SDGW: IRN02-12

Account No: 06948
AWD Technologies, Inc.
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Pittsburgh, PA 15276

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		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

55



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100
313



LLI Sample No. SW 2207704
Collected: 10/21/94 at 15:30 by DNM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-548-13-102194 Grab Soil Sample

Account No: 06948
AWD Technologies, Inc.
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Pittsburgh, PA 15276

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Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
54813 SDG#: IRN02-13

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	53.3	9.7	mg/kg	63.	11.
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.
0111	Moisture	15.6	0.5	% by wt.		

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:45:55 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



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56

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913



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Page: 2 of 3

LLI Sample No. SW 2207704

Collected: 10/21/94 at 15:30 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54B-13-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

54B13 SDG#: IRN02-13

Account No: 06948
AWD Technologies, Inc.
Building 111
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Pittsburgh, PA 15276

P.O. SC-94-1061-COM
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		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



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2425 New Holland Pike
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717-656-2301

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313



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Page: 1 of 3

LLI Sample No. SW 2207705

Collected: 10/21/94 at 15:40 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54B-35-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
54B35 SDG#: 1RN02-14

Account No: 06948
AWD Technologies, Inc.
Building III
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Pittsburgh, PA 15276

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CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	68.8	9.8	mg/kg	83.	12.
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.
0111	Moisture	17.4	0.5	% by wt.		
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.					

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:46:06 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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9 11



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Page: 2 of 3

LLI Sample No. SW 2207705

Collected: 10/21/94 at 15:40 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-548-35-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
54835 SDG#: IRN02-14

Account No: 06948
AWD Technologies, Inc.
Building 111
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Pittsburgh, PA 15276

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34835 SOG#: 1RN02-14		AS RECEIVED			DRY WEIGHT		
CAT			LIMIT OF			LIMIT OF	
NO.	ANALYSIS NAME	RESULTS	QUANTITATION	UNITS	RESULTS	QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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LLI Sample No. SW 2207706

Collected: 10/21/94 at 14:55 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54C-13-102194 Unspiked Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

54C13 SDG#: IRN02-15BK

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

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CAT NO.	ANALYSIS NAME	AS RECEIVED			UNITS	DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION			RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)				See Page 2		
1646	Barium	49.0	9.5		mg/kg	58.	11.
9001	Styrene	< 5.	5.		ug/kg	< 6.	6.
0111	Moisture	15.5	0.5		% by wt.		
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:46:17 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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Page: 2 of 3

LLI Sample No. SW 2207706

Collected: 10/21/94 at 14:55 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54C-13-102194 Unspiked Grab Soil Sample

Account No: 06948

AWD Technologies, Inc.

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Pittsburgh, PA 15276

P.O. SC-94-1061-COM

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Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

54C13 SDG#: IRN02-15BK

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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61

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3 * 2



LLI Sample No. SW 2207707
Collected: 10/21/94 at 14:55 by DNM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-54C-13-102194 Matrix Spike Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
54C13 SDG#: IRN02-15MS

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

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CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	244.	9.6	mg/kg	289.	11.	
9001	Styrene	22.	5.	ug/kg	26.	6.	
0118	Moisture	15.5	0.5	% by wt.			

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:46:28 D 0002 21 0 118283 440395
603 25.00 00032400 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
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717-656-2301

See reverse side for explanation of symbols and abbreviations





LLI Sample No. SW 2207707

Collected: 10/21/94 at 14:55 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54C-13-102194 Matrix Spike Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
54C13 SDG#: 1RN02-15MS

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

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		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	180.	100.	ug/kg	210.	120.	
3440	Methylene Chloride	23.	5.	ug/kg	27.	6.	
3458	Ethylbenzene	23.	5.	ug/kg	27.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
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717-656-2301

See reverse side for explanation of symbols and abbreviations





LLI Sample No. SW 2207708

Collected: 10/21/94 at 14:55 by DHM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-54C-13-102194 Matrix Spike Duplicate Grab Soil
Sample
Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
54C13 SDG#: IRN02-15MSD

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

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Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	252.	9.9	mg/kg	298.	12.	
9001	Styrene	22.	5.	ug/kg	26.	6.	
0118	Moisture	15.5	0.5	% by wt.			

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ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:46:39 0 0002 21 0 118283 440395
603 25.00 00032400 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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3 13



LLI Sample No. SW 2207708

Collected: 10/21/94 at 14:55 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54C-13-102194 Matrix Spike Duplicate Grab Soil Sample

Dow Hanging Rock - Ironston, OH Proj. No. 7015.600

54C13 SDG#: IRN02-15MSD

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

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		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/B240A)						
3439	Acrylonitrile	190.	100.	ug/kg	220.	120.
3440	Methylene Chloride	25.	5.	ug/kg	30.	6.
3458	Ethylbenzene	24.	5.	ug/kg	28.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations

65



22
913



LLI Sample No. SW 2207709

Collected: 10/21/94 at 14:55 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54C-13-102194 Duplicate Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

54C13 SDG#: IRN02-150UP

Account No: 06948
 AWD Technologies, Inc.
 Building 111
 Penn Center West, Suite 300
 Pittsburgh, PA 15276

P.O. SC-94-1061-COM
 Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1646	Barium	78.8	9.8	mg/kg	93	12
0118	Moisture	15.5	0.5	% by wt.		
0121	Moisture Duplicate	15.2	0.5	% by wt.		

The duplicate moisture value is provided to assess the precision of the moisture test. For comparability purposes, the initial moisture determination is the value used to perform dry weight calculations.

1 COPY TO AWD Technologies, Inc.
 1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

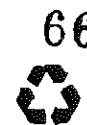
Questions? Contact your Client Services Representative
 Eileen R. Hostetler at (717) 656-2301
 04:46:50 D 0002 21 0 118283 440395
 603 25.00 00005100 ASR000

Respectfully Submitted
 Ramona V. Layman, Group Leader
 ICP Metals/Leachates



Lancaster Laboratories, Inc.
 2425 New Holland Pike
 Lancaster, PA 17601-5994
 717-656-2301

See reverse side for explanation of symbols and abbreviations.



* 321
 9 13



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Page: 1 of 3

LLI Sample No. SW 2207710

Collected: 10/21/94 at 15:05 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54C-35-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

54C35 SDG#: IRN02-16

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1D61-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SWB46/8240A)			See Page 2			
1646	Barium	65.8	9.8	mg/kg	79.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	17.1	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:46:57 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations

67



100
9-73



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Page: 2 of 3

LLI Sample No. SW 2207710

Collected: 10/21/94 at 15:05 by ONM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-54C-35-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
54C35 SDG#: IRN02-16

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

68

See reverse side for explanation of symbols and abbreviations



22
9 13



LLI Sample No. SW 2207711

Collected: 10/22/94 at 10:15 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20C-46-102294 Grab Soil Sample

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
20C46 SDG#: IRN02-17

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	93.3	9.8	mg/kg	113.	12.
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.
0111	Moisture	17.3	0.5	% by wt.		
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.					

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:47:08 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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* 22
9 13



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Page: 2 of 3

LLI Sample No. SW 2207711

Collected: 10/22/94 at 10:15 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20C-46-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
20C46 SDG#: IRN02-17

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations



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911



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Page: 1 of 3

LLI Sample No. SW 2207712

Collected: 10/22/94 at 09:30 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

OHR-208-02-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
20802 SDG#: IRN02-18

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/B240A)			See Page 2			
1646	Barium	58.	10.	mg/kg	69.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	16.2	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:47:18 D 0002 21 0 118283 440395
603 25.00 00033600 ASR0DD

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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* 22
9 * 3



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Page: 2 of 3

LLI Sample No. SW 2207712

Collected: 10/22/94 at 09:30 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20B-02-102294 Grab Soil Sample

Account No: 06948

AWD Technologies, Inc.

Building III

Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-94-1061-COM

Rel.

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20802 SDG#: IRN02-18

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	6.	5.	ug/kg	7.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations



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* 221-
912



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Page: 1 of 3

LLI Sample No. SW 2207713

Collected: 10/22/94 at 09:40 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20B-46-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20B46 SDG#: IRN02-19

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	UNITS
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	86.1	9.8	mg/kg	106.	12.	
9001	Styrene	38.	5.	ug/kg	47.	6.	
0111	Moisture	18.5	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:47:31 D 0002 21 0 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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* 22
9:13



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Page: 2 of 3

LLI Sample No. SW 2207713

Collected: 10/22/94 at 09:40 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-208-46-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
20B46 SDG#: IRN02-19

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/B240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	23.	5.	ug/kg	28.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations.



*22-
912



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Page: 1 of 3

LLI Sample No. SW 2207714
Collected: 10/22/94 at 10:10 by DNM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-20C-24-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
20C24 SDG#: IRN02-20*

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	70.8	9.5	mg/kg	83.	11.
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.
0111	Moisture	15.1	0.5	% by wt.		
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.					

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris Macoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:47:42 D 0002 21 D 118283 440395
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations



75
917



LLI Sample No. SW 2207714

Collected: 10/22/94 at 10:10 by DNM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20C-24-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
20C24 SDG#: IRN02-20*

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.D. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations.

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* 22*
9:13

APPENDIX B
SUPPORT DOCUMENTATION

QUALITY ASSURANCE SUMMARY

BLANKS

Lab Name: LANCASTER LABORATORIES

SDG No.: IRN02

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
			1	C	2	C	3	C			
Barium			2.0	B							P

QUALITY ASSURANCE SUMMARY

BLANKS

Lab Name: LANCASTER LABORATORIES

SDG No.: IRN02

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
		1	C	2	C	3	C			
Barium	3.3	2.0	B	5.6	B	3.3	B	0.332	B	P



Lancaster Laboratories

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SOIL VOLATILE SURROGATE RECOVERY

2B

LAB NAME: LANCASTER LABS

SDG No: IRN02

LEVEL: MED

	EPA SAMPLE NO.	S1 (DCE) #	S2 (TOL) #	S3 (BFB) #	OTHER	TOT OUT
01	11A46	117	112	136 D		
02						
03	LAB QC					
04	VLKH10	101	97	101		
05	VLKH14	107	101	99		
06	VLKH15	90	94	93		
07	53A46DL	84	83	91		
08	53A46DLMS	90	92	90		
09	53A46DLMSD	99	104	100		
10	LCSMH04	99	103	105		
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

				QC LIMITS
S1	(DCE)	=	1,2-Dichloroethane-d4	70 - 121
S2	(TOL)	=	Toluene-d8	81 - 117
S3	(BFB)	=	4-Bromofluorobenzene	74 - 121

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

Lancaster Laboratories, Inc.
GC/MS Volatiles Matrix Spike/Spike Duplicate Recoveries

Unspiked: ^HCR16
53A46DL 2206904
Method: 1177
Instrument: HP03974

Matrix spike: ^HM306
53A46DLMS 2206904
Matrix/Level: SM
Dilution Factor: 1.0

Spike Duplicate: ^HM307
53A46DLMSD2206904
Batch: H942992AB
% Moisture: 20

COMPOUND NAME	SPIKE LEVEL	US CONC UG/KG	MS CONC UG/KG	MSD CONC UG/KG	MS REC %	MSD REC %	RPD %	RANGE LOWER-UPPER	IN SPEC
Chloromethane	3125.00	0.00	5240.76	1684.53	168	54	103	1-273	YES
Vinyl Chloride	3125.00	0.00	5982.91	2132.35	191	68	95	1-251	YES
Bromomethane	3125.00	0.00	6029.40	2569.64	193	82	81	1-242	YES
Chloroethane	3125.00	0.00	5869.83	2194.70	188	70	91	14-230	YES
Trichlorofluoromethane	3125.00	0.00	4695.47	3519.79	150	113	28	17-181	YES
Acrolein	23437.50	0.00	10982.64	6144.31	47	26	58	22-169	YES
1,1-Dichloroethene	3125.00	0.00	2840.00	2627.12	91	84	8	1-234	YES
Acetone	23437.50	0.00	22143.39	21323.87	94	91	3	19-150	YES
Carbon Disulfide	23437.50	0.00	33067.30	28791.73	141	123	14	29-183	YES
Methylene Chloride	3125.00	0.00	4117.27	3986.74	132	128	3	1-221	YES
Acrylonitrile	23437.50	0.00	22158.54	21771.01	94	93	1	51-138	YES
1,1-Dichloroethane	3125.00	0.00	3075.61	2967.60	98	95	3	59-155	YES
1,2-Dichloroethene (total)	6250.00	0.00	6755.89	6702.04	108	107	1	54-156	YES
2-Butanone	23437.50	0.00	25688.13	25875.87	110	110	0	22-167	YES
Chloroform	3125.00	0.00	3019.45	3122.58	97	100	-3	51-138	YES
1,2-Dichloroethane	3125.00	0.00	2942.18	2967.35	94	95	-1	49-155	YES
Vinyl Acetate	15625.00	0.00	15306.76	17353.33	98	111	-12	19-190	YES
1,1,1-Trichloroethane	3125.00	0.00	4155.93	4097.95	133	131	2	52-162	YES
Carbon Tetrachloride	3125.00	0.00	3119.43	3076.65	100	98	2	70-140	YES
Benzene	3125.00	0.00	4093.61	3987.09	131	128	2	37-151	YES
Trichloroethene	3125.00	0.00	4256.29	4287.67	136	137	-1	71-157	YES
1,2-Dichloropropane	3125.00	0.00	2955.61	3008.88	94	96	-2	1-210	YES
Bromodichloromethane	3125.00	0.00	2985.25	3034.13	96	97	-1	35-155	YES
2-Chloroethyl Vinyl Ether	3125.00	0.00	3005.40	2598.98	96	83	14	1-305	YES
cis-1,3-Dichloropropene	3125.00	0.00	3474.81	3527.29	111	113	-2	1-227	YES
trans-1,3-Dichloropropene	1187.50	0.00	1243.64	1262.86	105	106	-1	17-183	YES
1,1,2-Trichloroethane	3125.00	0.00	2946.21	3001.60	94	96	-2	52-150	YES
Dibromochloromethane	3125.00	0.00	2924.95	2959.74	94	95	-1	53-149	YES
Bromoform	3125.00	0.00	2825.20	2852.64	90	91	-1	45-169	YES
4-Methyl-2-Pentanone	15625.00	0.00	12942.57	12727.97	83	81	2	50-124	YES
Toluene	3125.00	0.00	3948.40	4018.09	126	128	-2	47-150	YES
Tetrachloroethene	3125.00	0.00	4119.84	4290.86	132	137	-4	64-148	YES
2-Hexanone	15625.00	0.00	14517.80	14288.83	93	91	2	52-140	YES
Chlorobenzene	3125.00	0.00	2994.29	3038.23	96	97	-1	37-160	YES
Ethylbenzene	3125.00	2206.49	24945.39	8406.36	728	198	114	37-162	NO

N/C = Could not calculate

Lab Chronicle: _____ Ent. by _____

Ver. by _____

* XRPD for this compound exceeds method specified limit.

Lancaster Laboratories, Inc.
GC/MS Volatiles Matrix Spike/Spike Duplicate Recoveries
=====

Unspiked: ^HCR16
53A460L 2206904
Method: 1177
Instrument: HP03974

+SPECIALS

Matrix spike: ^HN306
53A460LMS 2206904
Matrix/Level: SM
Dilution Factor: 1.0

Spike Duplicate: ^HN307
53A460LMSD2206904
Batch: K942992AB
% Moisture: 20

COMPOUND NAME	SPIKE LEVEL	US CONC UG/KG	MS CONC UG/KG	MSD CONC UG/KG	MS REC %	MSD REC %	RPD %	RANGE LOWER-UPPER	IN SPEC
Xylene (total)	9375.00	0.00	8221.29	11302.78	88	120	-31	61-165	YES
Styrene	3125.00	3341.45	23914.41	9450.58	658	195	108	74-136	NO
1,1,2,2-Tetrachloroethane	3125.00	0.00	3009.88	3441.01	96	110	-14	46-157	YES

N/C = Could not calculate

Lab Chronicle: _____ Ent. by _____

_____ Ver. by _____

* %RPD for this compound exceeds method specified limit.

DOW ENVIRONMENTAL, INC.

DOW-HANGING ROCK

SDG# IRN02-01

FIELD DUPLICATE RESULTS

Compound	DHR-54C-13-102194	DHR-54C-13-102194DUP	Control Limit
Acrylonitrile (ug/kg)	< 120		
Methylene Chloride (ug/kg)	< 6		
Ethylbenzene (ug/kg)	< 6		
Styrene (ug/kg)	< 6		
Barium (mg/kg)	58	93	+/- 50%
Moisture (% by wt.)	15.5	15.2	+/- 50%



*A Subsidiary of
The Dow Chemical Company*

PGH-95-CDY-0030

DATE January 10, 1995

TO Mr. Kristian Macoskey
Dow Environmental, Inc.
Pittsburgh, Pennsylvania

FROM Cheryl Young
Dow Environmental, Inc.

SUBJECT Data Validation of:
Volatile Organic Chemicals and Barium

Re: The Dow Chemical Company
Dow Hanging Rock - Ironton, Ohio

Lancaster Laboratories Sample Numbers: 2207738-2207760

SDG#: IRN03

<u>Soil Samples:</u>	DHR-20C-02-102294	DHR-BG3-24-102294
	DHR-20C-02-102294DUP	DHR-BG3-46-102294
	DHR-BG1-02-102294	DHR-BG3-68-102294
	DHR-BG1-24-102294	DHR-20C-24MS-102294
	DHR-BG1-46-102294	DHR-16MSD-24-102294
	DHR-BG1-68-102294	DHR-23B-13-102294
	DHR-BG2-02-102294	DHR-8A-46-102294
	DHR-BG2-24-102294	DHR-16A-24-102294
	DHR-BG2-46-102294	DHR-21B-13DUP-102294
	DHR-BG2-68-102294	
	DHR-BG3-02-102294	

Water Sample: DHR-FBLANK1-102294

Field Duplicates: Sample DHR-20C-02-102294DUP is a field duplicate
of sample DHR-20C-02-102294.

AWD Technologies, Inc.

Penn Center West Building III Suite 300 Pittsburgh Pennsylvania 15276 Telephone 412 788 2717 Fax 412 788 1316

Overview

This set of samples collected on October 22, 1994, containing twenty (20) soil samples, including one field duplicate pair, and one (1) water sample included as a field blank, were analyzed for volatile organic chemicals by EPA SW-846 Method 8240 and Barium using Method 6010A. The percent moisture was determined by using modified Method 160.3 for each environmental sample.

Summary

All compounds were successfully analyzed in all samples. The organic analytical data were evaluated by the following quality assurance/quality control (QA/QC) parameters where applicable: holding times, initial and continuing calibrations, system monitoring compound/surrogate spike recoveries, method blanks, field duplicates, matrix spike/matrix spike duplicates (MS/MSDs), laboratory control samples, analytical sequence, compound identification and quantitation, and transcription.

The inorganic analytical data were evaluated by the following quality assurance/quality control (QA/QC) parameters where applicable: technical holding times, initial and continuing calibrations, laboratory blanks, ICP interference check samples, matrix and analytical spike recoveries, laboratory duplicates, laboratory control samples, ICP serial dilutions, and transcription.

Validated sample analysis results are listed on the attached data summary form. Areas of concern with respect to data quality and usability are discussed below.

Minor Issues

Barium was reported in the laboratory blanks. All sample results were positive and greater than five times (>5X) the greatest amount of contamination. No qualification was indicated.

Notes

Comparisons of the field duplicate pair DHR-20C-02-102294 and DHR-20C-02-102294DUP were within quality control limits. These comparisons are included in the support documentation section of this report.

Please note that several samples were not included on the chain of custody. The assumption was made that these samples were submitted with those listed on the chain of custody.

PGH-95-CDY-0030
Mr. Kristian Macoskey
Dow Environmental Inc.
January 10, 1995 - Page 3

The laboratory reported that at the time of entry, samples 2207738 and 2207741 were inadvertently assigned the same sample code, 20C02. Sample 2207741 is the duplicate for 2207738.

Information Regarding Report Content

Attachments:

1. Glossary of data qualifier codes.
2. Data Summary. This may include:
 - a) All positive results with qualifier codes, if applicable.
 - b) All estimated detection limits qualified with UJ.
3. Appendix A - Results as Reported by the Laboratory.
4. Appendix B - Support Documentation includes details to support the statements made in this report.

GLOSSARY OF DATA QUALIFIER CODES

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds)

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

(NO CODE) = Confirmed identification.

R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. The result is unusable.

CODES RELATED TO QUANTITATION

(can be used for positive results and sample quantitation limits)

J = Analyte present. Reported value may not be accurate or precise.

UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

DATA SUMMARY

DOW ENVIRONMENTAL, INC.
DOW - HANGING ROCK
FRONTON - GRAB SOIL SAMPLES / SDG # IRN03-01BK
DATA SUMMARY

Compound	DHR-20C-02-102294	DHR-20C-02-102294Dup	DHR-BG1-02-102294	DHR-BG1-24-102294	DHR-BG1-46-102294	DHR-BG1-68-102294	DHR-BG2-02-102294
Acrylonitrile (ug/kg)	< 110	< 110					
Methylene Chloride (ug/kg)	7	< 6					
Ethylbenzene (ug/kg)	< 6	< 6					
Styrene (ug/kg)	< 6	< 6					
Barium (mg/kg)	62	66	65	66	116	154	87
Moisture (% by wt.)	12.7	12.6	15.5	16.0	16.4	17.0	16.9

Compound	DHR-BG2-24-102294	DHR-BG2-46-102294	DHR-BG2-68-102294	DHR-BG3-02-102294	DHR-BG3-24-102294	DHR-BG3-46-102294	DHR-BG3-68-102294
Acrylonitrile (ug/kg)							
Methylene Chloride (ug/kg)							
Ethylbenzene (ug/kg)							
Styrene (ug/kg)							
Barium (mg/kg)	87	118	170	100	79	116	151
Moisture (% by wt.)	16.6	16.6	17.1	16.8	16.0	15.8	17.0

Compound	DHR-20C-24MS-102294	DHR-16MSD-24-102294	DHR-23B-13-102294	DHR-8A-46-102294	DHR-16A-24-102294	DHR-21B-13DUP-102294	DHR-FBLANK1-102294
Acrylonitrile (ug/kg)	< 120	< 120	< 120	< 120	< 120		< 100
Methylene Chloride (ug/kg)	< 6	< 6	< 6	< 6	< 6		< 5
Ethylbenzene (ug/kg)	< 6	< 6	< 6	< 6	< 6		< 5
Styrene (ug/kg)	< 6	< 6	< 6	< 6	< 6		< 5
Barium (mg/kg)		110	74	130	101	48	< 0.10
Moisture (% by wt.)	15.0	18.9	16.1	18.2	17.6	15.5	

APPENDIX A
RESULTS AS REPORTED BY THE LABORATORY



LLI Sample No. SW 2207738

Collected: 10/22/94 at 09:55 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20C-02-102294 Unspiked Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
20C02 SDG#: IRN03-01BK

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	55.	10.	mg/kg	62.	11.
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.
0111	Moisture	12.7	0.5	% by wt.		
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:48:19 D 0002 24 0 118283 440403
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

28



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





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Page: 2 of 3

LLI Sample No. SW 2207738

Collected: 10/22/94 at 09:55 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20C-02-102294 Unspiked Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20C02 SDG#: IRN03-01BK

Account No: 06948

AWD Technologies, Inc.

Building III

Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-94-1061-COM

Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 110.	110.	
3440	Methylene Chloride	6.	5.	ug/kg	7.	6.	
3450	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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717-656-2301

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LLI Sample No. SW 2207739

Collected: 10/22/94 at 09:55 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20C-02-102294 Matrix Spike Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20C02 SDG#: IRN03-01MS

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/B240A)			See Page 2			
1646	Barium	235.	10.	mg/kg	269.	11.	
9001	Styrene	20.	5.	ug/kg	21.	6.	
0118	Moisture	12.7	0.5	% by wt.			

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:48:29 0 0002 24 0 118283 440403
603 25.00 00032400 ASR000



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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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LLI Sample No. SW 2207739

Collected: 10/22/94 at 09:55 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20C-02-102294 Matrix Spike Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20C02 SDG#: IRN03-01MS

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	160.	100.	ug/kg	160.	110.
3440	Methylene Chloride	24.	5.	ug/kg	27.	6.
3458	Ethylbenzene	23.	5.	ug/kg	26.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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LLI Sample No. SW 2207740

Collected: 10/22/94 at 09:55 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20C-02-102294 Matrix Spike Duplicate Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20C02 SDG#: IRN03-01MSD

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT ND.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/B240A)			See Page 2			
1646	Barium	249.	10.	mg/kg	285.	11.	
9001	Styrene	20.	5.	ug/kg	23.	6.	
0118	Moisture	12.7	0.5	% by wt.			

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:48:40 D 0002 24 D 118283 440403
603 25.00 00032400 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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2
3



LLI Sample No. SW 2207740

Collected: 10/22/94 at 09:55 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20C-02-102294 Matrix Spike Duplicate Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20C02 SDG#: 1RN03-01MSD

Account No: D6948
AWD Technologies, Inc.
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Penn Center West, Suite 300
Pittsburgh, PA 15276

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		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	180.	100.	ug/kg	210.	110.
3440	Methylene Chloride	22.	5.	ug/kg	25.	6.
3458	Ethylbenzene	22.	5.	ug/kg	25.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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35



*20
9*



LLI Sample No. SW 2207741

Collected: 10/22/94 at 09:55 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20C-02-102294 Duplicate Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20C02 SDG#: IRN03-01DUP

Account No: 06948
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Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
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CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	58.	10.	mg/kg	66.	11.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0118	Moisture	12.7	0.5	% by wt.			
0121	Moisture Duplicate	12.6	0.5	% by wt.			
	The duplicate moisture value is provided to assess the precision of the moisture test. For comparability purposes, the initial moisture determination is the value used to perform dry weight calculations.						

1 CDPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:48:49 D 0002 24 0 118283 440403
603 25.00 00033600 ASR000



Lancaster Laboratories, Inc.
2425 New Holland Pike
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717-656-2301

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

34





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Page: 2 of 3

LLI Sample No. SW 2207741

Collected: 10/22/94 at 09:55 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

OHR-20C-02-102294 Duplicate Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20C02 SDG#: IRND3-01DUP

Account No: 06948

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Rel.

		AS RECEIVED			DRY WEIGHT		
CAT ND.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 110.	110.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

35



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations



* 2L
9 *



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Page: 1 of 3

LLI Sample No. WW 2207754

Collected: 10/22/94 at 16:30 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-FBLANK1-102294 Field Blank Grab Water Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

FB1DH SDG#: IRN03-148L

Account No: 06948

AWD Technologies, Inc.

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Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-94-1061-COM

Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED		
		RESULTS	LIMIT OF QUANTITATION	UNITS
1508	Purgeables (SW846/8240A)			See Page 2
1746	Barium	< 0.10	0.10	mg/l
9001	Styrene	< 5	5.	ug/l

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:50:20 D 0002 24 D 118283 440403
603 15.00 00029900 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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48



LLI Sample No. WW 2207754

Collected: 10/22/94 at 16:30 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-FBLANK1-102294 Field Blank Grab Water Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

FB10H SDG#: IRN03-14BL

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

AS RECEIVED

CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS
------------	---------------	---------	--------------------------	-------

Purgeables (SWB46/8240A)

3496	Acrylonitrile	< 100.	100.	ug/l
3497	Methylene Chloride	< 5.	5.	ug/l
3526	Ethylbenzene	< 5.	5.	ug/l

The GC/MS volatile sample was preserved with 1 + 1 HCl to pH < 2.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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2425 New Holland Pike
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717-656-2301

See reverse side for explanation of symbols and abbreviations



*2:
9



LLI Sample No. SW 2207755

Collected: 10/22/94 at 10:10 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-2DC-24MS-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

MSC24 SDG#: IRN03-15

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
0111	Moisture	15.0	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostettler at (717) 656-2301
04:50:29 D 0002 24 0 118283 440403
603 0.00 00029700 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations



50



LLI Sample No. SW 2207755

Collected: 10/22/94 at 10:10 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20C-24MS-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

MSC24 SDG#: IRN03-15

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





LLI Sample No. SW 2207756

Collected: 10/22/94 at 11:10 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-16MSD-24-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

16-24 SDG#: IRN03-16

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	89.2	9.9	mg/kg	110.	12.
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.
0111	Moisture	18.9	0.5	% by wt.		

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

1 COPY TO AWD Technologies, Inc.
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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:50:39 D 0002 24 0 118283 440403
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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LLI Sample No. SW 2207756

Collected: 10/22/94 at 11:10 by DM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-16MSD-24-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
16-24 SDG#: IRN03-16

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3456	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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LLI Sample No. SW 2207757

Collected: 10/22/94 at 11:30 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-23B-13-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
23B13 SDG#: IRN03-17

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
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CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	62.5	9.9	mg/kg	74.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	16.1	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:50:49 D 0002 24 0 118283 440403
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



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LLI Sample No. SW 2207757

Collected: 10/22/94 at 11:30 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-238-13-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
23813 SDG#: IRN03-17

Account No: D6948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

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Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



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LLI Sample No. SW 2207758

Collected: 10/22/94 at 13:40 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8A-46-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
8A-46 SDG#: IRN03-18

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

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CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/B240A)			See Page 2			
1646	Barium	105.	9.9	mg/kg	130.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	18.2	0.5	% by wt.			

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
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04:50:59 D 0002 24 0 118283 440403
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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LLI Sample No. SW 2207758

Collected: 10/22/94 at 13:40 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8A-46-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

8A-46 SDG#: IRN03-18

Account No: 06948
AWD Technologies, Inc.
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Penn Center West, Suite 300
Pittsburgh, PA 15276

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CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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LLI Sample No. SW 2207759

Collected: 10/22/94 at 12:50 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-16A-24-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

16A24 SDG#: IRN03-19

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

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CAT NO.	ANALYSIS NAME	AS RECEIVED			UNITS	DRY WEIGHT		
		RESULTS	LIMIT OF	QUANTITATION		RESULTS	LIMIT OF	QUANTITATION
1177	Purgeables (SW846/8240A)				See Page 2			
1646	Barium	83.5	9.8		mg/kg	101.	12.	
9001	Styrene	< 5.	5.		ug/kg	< 6.	6.	
0111	Moisture	17.6	0.5		% by wt.			

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:51:09 D 0002 24 0 118283 440403
603 25.00 00033600 ASR000



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Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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LLI Sample No. SW 2207759

Collected: 10/22/94 at 12:50 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-16A-24-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

16A24 SDG#: IRN03-19

Account No: 06948
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Penn Center West, Suite 300
Pittsburgh, PA 15276

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		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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717-656-2301

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LLI Sample No. SW 2207760

Collected: 10/22/94 at 12:40 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-21B-13DUP-102294 Grab Soil Sample

Account No: 06948
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Pittsburgh, PA 15276

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Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
13821 SDG#: IRN03-20

CAT NO.	ANALYSIS NAME	AS RECEIVED		
		RESULTS	LIMIT OF QUANTITATION	UNITS
1646	Barium	41.	10.	mg/kg
0111	Moisture	15.5	0.5	% by wt.

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

DRY WEIGHT	
RESULTS	LIMIT OF QUANTITATION
48.	12.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:51:19 D 0002 24 0 118283 440403
603 25.00 00005100 ASR000

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Ramona V. Layman, Group Leader
ICP Metals/Leachates

60



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717-656-2301

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*28
9-10



LLI Sample No. SW 2207742

Collected: 10/22/94 at 14:25 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-BG1-02-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
BG102 SDG#: IRN03-02

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

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CAT NO.	ANALYSIS NAME	AS RECEIVED		
		RESULTS	LIMIT OF QUANTITATION	UNITS
1646	Barium	65.	10.	mg/kg
0111	Moisture	15.5	0.5	% by wt.
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.				

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
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04:49:00 D 0002 24 0 118283 440403
603 25.00 00005100 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



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Lancaster, PA 17601-5994
717-656-2301

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LLI Sample No. SW 2207743

Collected: 10/22/94 at 14:30 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-BG1-24-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
BG124 SDG#: IRN03-03

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			UNITS
		RESULTS	LIMIT OF QUANTITATION		
1646	Barium	55.3	9.9		mg/kg
0111	Moisture	16.0	0.5		% by wt.

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

DRY WEIGHT	
RESULTS	LIMIT OF QUANTITATION
66	12

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:49:06 0 0002 24 0 118283 440403
603 25.00 00005100 ASR000

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Ramona V. Layman, Group Leader
ICP Metals/Leachates

Analysis Report



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LLI Sample No. SW 2207744

Collected: 10/22/94 at 14:35 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-BG1-46-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

BG146 SOG#: IRN03-04

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1646	Barium	97.	10.	mg/kg	116.	12.
0111	Moisture	15.4	0.5	% by wt.		

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:49:13 D 0002 24 0 118283 440403
603 25.00 00005100 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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Analysis Report



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Page: 1 of 2

LLI Sample No. SW 2207745

Collected: 10/22/94 at 14:40 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-BG1-68-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
BG168 SOG#: IRN03-05

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED		
		RESULTS	LIMIT DF QUANTITATION	UNITS
1646	Barium	127.1	10.	mg/kg
0111	Moisture	17.0	0.5	% by wt.

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

DRY WEIGHT	
RESULTS	LIMIT DF QUANTITATION
154.1	12.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
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04:49:20 D 0002 24 0 118283 440403
603 25.00 00005100 ASR000

Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5004

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Ramona V. Layman, Group Leader
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LLI Sample No. SW 2207746

Collected: 10/22/94 at 14:50 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-BG2-02-102294 Grab Soil Sample

Oow Hanging Rock - Ironton, OH Proj. No. 7015.600

BG202 SDG#: IRN03-06

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

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Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED		
		RESULTS	LIMIT OF QUANTITATION	UNITS
1646	Barium	72.0	9.8	mg/kg
0111	Moisture	16.9	0.5	% by wt.

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

DRY WEIGHT	
RESULTS	LIMIT OF QUANTITATION
87.	12.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
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603 25.00 00005100 ASR000

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Ramona V. Layman, Group Leader
ICP Metals/Leachates

Analysis Report



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Page: 1 of 2

LLI Sample No. SW 2207747
Collected: 10/22/94 at 14:55 by DM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/16/95

DHR-BG2-24-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
BG224 SOG#: IRN03-07

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

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Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED		
		RESULTS	LIMIT OF QUANTITATION	UNITS
1646	Barium	73.	10.	mg/kg
0111	Moisture	15.6	0.5	% by wt.

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

DRY WEIGHT	
RESULTS	LIMIT OF QUANTITATION
87.	12.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hosterler at (717) 656-2301
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603 25.00 00005100 ASR000

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ICP Metals/Leachates

Analysis Report



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Page: 1 of 2

LLI Sample No. SW 2207748

Collected: 10/22/94 at 15:00 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-BG2-46-102294 Grab Soil Sample

Oow Hanging Rock - Ironton, OH Proj. No. 7015.600

BG246 SDG#: IRN03-08

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

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Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED		
		RESULTS	LIMIT OF QUANTITATION	UNITS
1646	Barium	98.5	9.9	mg/kg
0111	Moisture	16.6	0.5	% by wt.

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

RESULTS	LIMIT OF QUANTITATION
118.	12.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
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603 25.00 00005100 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

Analysis Report



Page: 1 of 2

LLI Sample No. SW 2207749

Collected: 10/22/94 at 15:05 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-BG2-68-102294 Grab Soil Sample

Gow Hanging Rock - Ironton, OH Proj. No. 7015.600

BG268 SOG#: IRN03-09

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

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Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED		
		RESULTS	LIMIT OF QUANTITATION	UNITS
1646	Barium	141	10.	mg/kg
0111	Moisture	17.1	0.5	% by wt.

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

DRY WEIGHT	
RESULTS	LIMIT OF QUANTITATION
170.	12.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
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603 25.00 00005100 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike



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Page: 1 of 2

LLI Sample No. SW 2207750

Collected: 10/22/94 at 15:10 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-BG3-02-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

BG302 SDG#: IRN03-10

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
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CAT NO.	ANALYSIS NAME	AS RECEIVED		
		RESULTS	LIMIT OF QUANTITATION	UNITS
1646	Barium	83.	10.	mg/kg
0111	Moisture	16.8	0.5	% by wt.

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

DRY WEIGHT	
RESULTS	LIMIT OF QUANTITATION
100.	12.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:49:52 D 0002 24 0 118283 440403
603 25.00 00005100 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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Analysis Report



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LLI Sample No. SW 2207751
Collected: 10/22/94 at 15:15 by DM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-BG3-24-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
BG324 SDG#: IRN03-11

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

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Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED		
		RESULTS	LIMIT OF QUANTITATION	UNITS
1646	Barium	66.7	9.9	mg/kg
0111	Moisture	16.0	0.5	% by wt.

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

DRY WEIGHT	
RESULTS	LIMIT OF QUANTITATION
79.	12.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:50:01 D 0002 24 D 118283 440403
603 25.00 00005100 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

Analysis Report



Lancaster Laboratories

Where quality is a science.

Page: 1 of 2

LLI Sample No. SW 2207752

Collected: 10/22/94 at 15:20 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-BG3-46-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

BG346 SDG#: IRN03-12

Account No: 06948

AWD Technologies, Inc.

Building III

Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-94-1061-COM

Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED		
		RESULTS	LIMIT OF QUANTITATION	UNITS
1646	Barium	97.9	9.9	mg/kg
0111	Moisture	15.8	0.5	% by wt.

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

DRY WEIGHT	
RESULTS	LIMIT OF QUANTITATION
116.	12.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:50:07 D 0002 24 0 118283 440403
603 25.00 00005100 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

46

Analysis Report



Lancaster Laboratories

Where quality is a science.

Page: 1 of 2

LLI Sample No. SW 2207753

Collected: 10/22/94 at 15:25 by DM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-BG3-68-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
BG368 SDG#: IRN03-13

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED		
		RESULTS	LIMIT OF QUANTITATION	UNITS
1646	Barium	126.0	9.8	mg/kg
0111	Moisture	17.0	0.5	% by wt.

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

DRY WEIGHT	
RESULTS	LIMIT OF QUANTITATION
151	12.

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskoy

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:50:14 0 0002 24 0 118283 440403
603 25.00 00005100 ASR000

Respectfully Submitted
Ranona V. Layman, Group Leader
ICP Metals/Leachates

Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994

APPENDIX B
SUPPORT DOCUMENTATION

QUALITY ASSURANCE SUMMARY

BLANKS

Name: LANCASTER LABORATORIES

SDG No.: IRN03

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	1	C	2	C	3	C		C	
Barium	1.9	U	1.9	U	15.7	B	1.9	U	0.220	U	P

Analysis Request/ Environmental Services Chain of Custody



Lancaster Laboratories
Where quality is a science.

For LLI use only

Acct. # 6948

Sample # 2267738-61

Please print. Instructions on reverse side correspond with circled numbers.

Client: ALWDTECHNOL0612 Acct. #:

Project Name/ID: INDONTON PWSID #:

Project Manager: KRIS MOSKAT PO #:

Sampler: DIMARTINICK Quote #:

Name of state where samples were collected:

Sample Identification

Sample ID	Date Collected	Time Collected
DHR-BG1-02-102294	102294	1425
DHR-BG1-24-102294	102294	1430
DHR-BG1-46-102294	102294	1435
DHR-BG1-68-102294	102294	1440
DHR-BG2-02-102294	102294	1450
DHR-BG2-24-102294	102294	1455
DHR-BG2-46-102294	102294	1500
DHR-BG2-68-102294	102294	1505
DHR-BG3-02-102294	102294	1510
DHR-BG3-24-102294	102294	1515

Turnaround Time Requested (TAT) (please circle): Normal Rush
(Rush TAT is subject to LLI approval and surcharge.) PER CONTRACT
Date results are needed:

Rush results requested by (please circle): Phone Fax
Phone # 412-268-2717 Fax #:

Data Package Options (please circle if requested)

QC Summary GLP

Type I (Tier I) Other

Type II (Tier II)

Type III (NJ Red. Del.)

Type IV (C)

SDG Complete?

Yes No

Site-specific QC required?

Yes No

(if yes, indicate QC sample and submit triplicate volume.)

Internal Chain of Custody required? Yes No

Matrix	Analysis Requested	For LLI use only
4	5	FSC: <u>106280</u> SCR #: <u>106280</u>
6	6	6
7	7	7
8	8	8
9	9	9



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For LLL use only

Acct. # 6948

Sample # 2207738-61

Please print. Instructions on reverse side correspond with circled numbers.

Client: <u>AND TECHNOLOGIES</u>		Project Name: <u>IRONSTON</u>		Project Manager: <u>KRISTIN COSA</u>		Sampler: <u>D. MARTIN</u>		Name of state where samples were collected: _____	
ACR #:		PWSID #:		90 #:		Quote #:			
Sample ID	Date Collected	Time Collected	Matrix	Container	Other	Relinquished by	Relinquished by	Relinquished by	Relinquished by
DHR-BG3-46-102294	10/22/94	1520	X	1	X	Andrew Miller	10/23/94 14:00	Received by:	Time
DHR-BG3-68-102294	10/22/94	1525	X	1	X	Received by:	10/23/94 16:30	Received by:	Time
DHR-FBIANK1-102294	10/22/94	1630	X	1	X	Received by:	10/23/94 16:30	Received by:	Time
<p>Turnaround Time Requested (TAT) (please circle): Normal Rush</p> <p>(Rush TAT is subject to LLI approval and surcharge.) <u>PER CONTRACT</u></p> <p>Date results are needed: _____</p> <p>Rush results requested by (please circle): Phone Fax</p> <p>Phone #: <u>412 756 2717</u> Fax #: _____</p>									
<p>Data Package Options (please circle if requested)</p> <p>QC Summary GLP Other</p> <p>Type I (Tier I) SDG Complete? Yes No</p> <p>Type II (Tier II) Silte-specific QC required? Yes No</p> <p>Type III (NJ Red. Del.) (If yes, indicate QC sample and submit triplicate volume.)</p> <p>Type IV (GLP) Internal Chain of Custody required? Yes No</p>									

DOW ENVIRONMENTAL , INC.

DOW-HANGING ROCK

SDG# IRN03-01BK

FIELD DUPLICATE RESULTS

Compound	DHR-20C-02-102294	DHR-20C-02-102294Dup	Control Limits
Acrylonitrile (ug/kg)	< 110	< 110	+/- 4X CRDL
Methylene Chloride (ug/kg)	7	< 6	+/- 4X CRDL
Ethylbenzene (ug/kg)	< 6	< 6	+/- 4X CRDL
Styrene (ug/kg)	< 6	< 6	+/- 4X CRDL
Barium (mg/kg)	62	66	+/- 50%
Moisture (% by wt.)	12.7	12.6	+/- 50%



A Subsidiary of
The Dow Chemical Company

PGH-95-CDY-0029

DATE January 10, 1995

TO Mr. Kristian Macoskey
Dow Environmental, Inc.
Pittsburgh, Pennsylvania

FROM Cheryl Young
Dow Environmental, Inc.

SUBJECT Data Validation of:
Volatile Organic Chemicals and Barium

Re: The Dow Chemical Company
Dow Hanging Rock - Ironton, Ohio

Lancaster Laboratories Sample Numbers: 2207762-2207773
2208611-2208614

SDG#: IRN04

<u>Samples:</u>	DHR-23C-13DUP-102294	DHR-43B-02DUP-102294
	DHR-22B-13-102294	DHR-43B-02-102294
	DHR-22B-13-102294DUP	DHR-23C-13-102294
	DHR-21B-13-102294	DHR-54C-13DUP-102194
	DHR-19A-24-102294	DHR-20C-02DUP-102194
	DHR-19A-24DUP-102294	DHR-20A-46DUP-102194
	DHR-20B-24DUP-102294	

Field Duplicates: Sample DHR-22B-13-102294DUP is a field duplicate of sample DHR-22B-13-102294.

Overview

This set of samples collected on October 21 and 22, 1994, containing thirteen (13) soil samples, including one field duplicate pair, were analyzed for volatile organic chemicals by EPA SW-846 Method 8240 and Barium using Method 6010A. The percent moisture was determined by using modified Method 160.3 for each environmental sample.

AWD Technologies, Inc.

Penn Center West Building III Suite 300 Pittsburgh Pennsylvania 15276 Telephone 412 788 2717 Fax 412 788 1316

Summary

All compounds were successfully analyzed in all samples. The organic analytical data were evaluated by the following quality assurance/quality control (QA/QC) parameters where applicable: holding times, initial and continuing calibrations, system monitoring compound/surrogate spike recoveries, method blanks, field duplicates, matrix spike/matrix spike duplicates (MS/MSDs), laboratory control samples, analytical sequence, compound identification and quantitation, and transcription.

The inorganic analytical data were evaluated by the following quality assurance/quality control (QA/QC) parameters where applicable: technical holding times, initial and continuing calibrations, laboratory blanks, ICP interference check samples, matrix and analytical spike recoveries, laboratory duplicates, laboratory control samples, ICP serial dilutions, and transcription.

Validated sample analysis results are listed on the attached data summary form. Areas of concern with respect to data quality and usability are discussed below.

Notes

All data evaluated for all analytical results were within quality control limits. Therefore, no qualification of data was indicated.

Comparisons of the field duplicate pair DHR-22B-13-102294 and DHR-22B-13-102294DUP were within quality control limits. These comparisons are included in the support documentation section of this report.

Please note that some samples were not listed on the chain-of-custody provided with this data package.

Information Regarding Report Content

Attachments:

1. Glossary of data qualifier codes.
2. Data Summary. This may include:
 - a) All positive results with qualifier codes, if applicable.
 - b) All estimated detection limits qualified with UJ.
3. Appendix A - Results as Reported by the Laboratory.
4. Appendix B - Support Documentation includes details to support the statements made in this report.

GLOSSARY OF DATA QUALIFIER CODES

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds)

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

(NO CODE) = Confirmed identification.

R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. The result is unusable.

CODES RELATED TO QUANTITATION

(can be used for positive results and sample quantitation limits)

J = Analyte present. Reported value may not be accurate or precise.

UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

DATA SUMMARY

DOW ENVIRONMENTAL, INC.
DDW - HANGING ROCK
IRONTON - GRAB SOIL SAMPLES / SDG# IRN04-01
DATA SUMMARY

Compound	DHR-23C-13DUP-102294	DHR-22B-13-102294	DHR-22B-13-DUP-102194	DHR-21B-13-102294	DHR-19A-24-102294	DHR-19A-24DUP-102294	DHR-20B-24DUP-102294
Acrylonitrile (ug/kg)	< 120	< 120	< 120	< 120	< 120	< 120	< 120
Methylene Chloride (ug/kg)	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Ethylbenzene (ug/kg)	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Styrene (ug/kg)	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Barium (mg/kg)	68	60	NA	50	92	NA	NA
Moisture (% by wt.)	16.5	16.3	16.3	16.3	16.9	17.4	17.1

Compound	DHR-43B-02DUP-102294	DHR-43B-02-102294	DHR-23C-13-102294	DHR-54C-13-DUP-102194	DHR-20C-02-DUP-102194	DHR-20A-46-DUP-102194
Acrylonitrile (ug/kg)	< 110	< 110	< 120	< 120	< 110	< 120
Methylene Chloride (ug/kg)	< 6	< 6	< 6	< 6	< 6	< 6
Ethylbenzene (ug/kg)	< 6	9	< 6	< 6	< 6	82
Styrene (ug/kg)	< 6	< 6	< 6	< 6	< 6	49
Barium (mg/kg)	54	102	76	NA	NA	NA
Moisture (% by wt.)	12.4	11	16.5	15.5	12.7	18.3

APPENDIX A
RESULTS AS REPORTED BY THE LABORATORY



LLI Sample No. SW 2207762

Collected: 10/22/94 at 11:45 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-23C-13DUP-102294 Grab Soil Sample

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
23C13 SDG#: IRN04-01

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	57.	10.	mg/kg	68.	12.
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.
0111	Moisture	16.5	0.5	% by wt.		
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.					

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:51:47 D 0002 12 0 118283 440404
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

22



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





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Page: 2 of 3

LLI Sample No. SW 2207762

Collected: 10/22/94 at 11:45 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-23C-13DUP-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
23C13 SDG#: IRN04-01

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Nostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

23

See reverse side for explanation of symbols and abbreviations.



21
31



LLI Sample No. SW 2207763

Collected: 10/22/94 at 12:15 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-228-13-102294 Unspiked Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
22813 SDG#: IRN04-02BK

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED				DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS		RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SWB46/B240A)			See Page 2			
1646	Barium	50.	10.	mg/kg		60.	12.
9001	Styrene	< 5.	5.	ug/kg		< 6.	6.
0111	Moisture	16.3	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:51:58 D 0002 12 0 118283 440404
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

24



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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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LLI Sample No. SW 2207763

Collected: 10/22/94 at 12:15 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-22B-13-102294 Unspiked Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

22B13 SDG#: IRN04-02BK

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

25





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Page: 1 of 3

LLI Sample No. SW 2207764

Collected: 10/22/94 at 12:15 by DM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-22B-13-102294 Matrix Spike Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
22B13 SDG#: IRN04-02MS

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	272.	10.	mg/kg	324.	12.
9001	Styrene	22.	5.	ug/kg	26.	6.
0118	Moisture	16.3	0.5	% by wt.		

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostettler at (717) 656-2301
04:52:08 D 0002 12 0 118283 440404
603 25.00 00032400 ASR000



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Lancaster, PA 17601-5994
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Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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Page: 2 of 3

LLI Sample No. SW 2207764

Collected: 10/22/94 at 12:15 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-22B-13-102294 Matrix Spike Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

22B13 SDG#: IRN04-02MS

Account No: 06948

AWD Technologies, Inc.

Building III

Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-94-1061-COM

Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	150.	100.	ug/kg	180.	120.	
3440	Methylene Chloride	23.	5.	ug/kg	27.	6.	
3458	Ethylbenzene	25.	5.	ug/kg	30.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





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Page: 1 of 3

LLI Sample No. SW 2207765

Collected: 10/22/94 at 12:15 by DM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-22B-13-102294 Matrix Spike Duplicate Grab Soil
Sample
Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
22B13 SOG#: IRN04-02MSD

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	250.	10.	mg/kg	299.	12.
9001	Styrene	21.	5.	ug/kg	25.	6.
0118	Moisture	16.3	0.5	% by wt.		

1 COPY TO AWD Technologies, Inc.
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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:52:18 D 0002 12 0 118283 440404
603 25.00 00032400 ASR000



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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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LLI Sample No. SW 2207765

Collected: 10/22/94 at 12:15 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-22B-13-102294 Matrix Spike Duplicate Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7D15.600

22B13 SDG#: IRN04-02MSD

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT ND.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	170.	100.	ug/kg	200.	120.
3440	Methylene Chloride	23.	5.	ug/kg	27.	6.
3458	Ethylbenzene	24.	5.	ug/kg	29.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

29





LLI Sample No. SW 2207766

Collected: 10/22/94 at 12:15 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-22B-13-102294 Duplicate Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

22B13 SDG#: IRN04-02DUP

Account No: D6948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1646	Barium	51.	10.	mg/kg	61.	12.	
D118	Moisture	16.3	0.5	% by wt.			
0121	Moisture Duplicate	16.4	0.5	% by wt.			

The duplicate moisture value is provided to assess the precision of the moisture test. For comparability purposes, the initial moisture determination is the value used to perform dry weight calculations.

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:52:30 0 0002 12 0 118283 44D4D4
603 25.00 00005100 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301





LLI Sample No. SW 2207767

Collected: 10/22/94 at 12:40 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-218-13-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

21B13 SDG#: IRN04-03

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED				DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS		RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	42.	10.	mg/kg		50.	12.
9001	Styrene	< 5.	5.	ug/kg		< 6.	6.
0111	Moisture	16.3	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:52:38 D 0002 12 0 118283 440404
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

31



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





LLI Sample No. SW 2207767

Collected: 10/22/94 at 12:40 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-218-13-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
21813 SDG#: TRN04-03

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostettler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations



32

21
3



Lancaster Laboratories

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Page: 1 of 3

LLI Sample No. SW 2207768

Collected: 10/22/94 at 09:10 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-19A-24-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

19A24 SDG#: IRN04-04

Account No: 06948

AWD Technologies, Inc.

Building III

Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-94-1061-COM

Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			UNITS	DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION			RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SWB46/8240A)				See Page 2			
1646	Barium	77.	10.		mg/kg	92.	12.	
9001	Styrene	< 5.	5.		ug/kg	< 6.	6.	
0111	Moisture	16.9	0.5		% by wt.			

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
D4:52:48 D 0002 12 0 118283 440404
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

33



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





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Page: 2 of 3

LLI Sample No. SW 2207768

Collected: 10/22/94 at 09:10 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-19A-24-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
19A24 SDG#: IRN04-04

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

34



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





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Page: 1 of 3

LLI Sample No. SW 2207769

Collected: 10/22/94 at 09:10 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-19A-24DUP-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

9A24D SDG#: IRN04-05

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
D111	Moisture	17.4	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						
9001	Styrene	5.	5.	ug/kg	5.6	6.	

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:52:59 D 0002 12 0 118283 440404
603 0.00 00029700 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

35



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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* 22
9 10



LLI Sample No. SW 2207769

Collected: 10/22/94 at 09:10 by OM

Submitted: 10/25/94 Reported: 11/14/94

Oiscard: 1/14/95

DHR-19A-24DUP-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
9A24D SDG#: IRN04-05

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SWB46/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

36



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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LLI Sample No. SW 2207770

Collected: 10/22/94 at 09:35 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-208-24DUP-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
2824D SDG#: 1RNO4-06

Account No: 06948
AMD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
0111	Moisture	17.1	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	

1 COPY TO AMD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:53:09 D 0002 12 0 118283 440404
603 0.00 00029700 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

37



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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LLI Sample No. SW 2207770

Collected: 10/22/94 at 09:35 by DM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-20B-24DUP-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
2824D SDG#: IRN04-06

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

38





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Page: 1 of 3

LLI Sample No. SW 2207771

Collected: 10/22/94 at 11:05 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-43B-020UP-102294 Grab Soil Sample

Oow Hanging Rock - Ironton, OH Proj. No. 7015.600
3B02D SDG#: IRN04-07

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT ND.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	47.	10.	mg/kg	54.	11.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	12.4	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:53:19 D 0002 12 0 118283 440404
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

39



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





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Page: 2 of 3

LLI Sample No. SW 2207771

Collected: 10/22/94 at 11:05 by DM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-43B-02DUP-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
38020 SDG#: IRN04-07

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/B240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 110.	110.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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Page: 1 of 3

LLI Sample No. SW 2207772

Collected: 10/22/94 at 11:05 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-438-02-102294 Grab Soil Sample

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
43802 SDG#: IRN04-08

CAT NO.	ANALYSIS NAME	AS RECEIVED			UNITS	DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION			RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)				See Page 2			
1646	Barium	90.	10.		mg/kg	102.	11.	
9001	Styrene	< 5.	5.		ug/kg	< 6.	6.	
0111	Moisture	11.0	0.5		% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.								

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:53:29 D 0002 12 0 118283 440404
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

41



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations.





LLI Sample No. SW 2207772

Collected: 10/22/94 at 11:05 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-43B-02-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
43B02 SDG#: IRN04-08

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 110.	110.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	8.	5.	ug/kg	9.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

42





LLI Sample No. SW 2207773

Collected: 10/22/94 at 11:45 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-23C-13-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

13C23 SDG#: IRN04-09

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	64.	10.	mg/kg	76.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	16.5	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:53:39 D 0002 12 0 118283 440404
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

43



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





LLI Sample No. SW 2207773

Collected: 10/22/94 at 11:45 by OM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-23C-13-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
13C23 SDG#: 1RN04-09

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/B240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





LLI Sample No. SW 2208611

Collected: 10/21/94 at 14:55 by DNM

Submitted: 10/27/94 Reported: 11/14/94

Discard: 11/29/94

DHR-54C-13-DUP-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

05413 SDG#: IRN04-10

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
0118	Moisture	15.5	0.5	% by wt.			
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:12:24 D 0002 4 0 D 440618
603 0.00 00028500 ASR000



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

45





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Page: 2 of 3

LLI Sample No. SW 2208611

Collected: 10/21/94 at 14:55 by DNM

Submitted: 10/27/94 Reported: 11/14/94

Discard: 11/29/94

DHR-54C-13-0UP-102194 Grab Soil Sample

0ow Hanging Rock - Ironton, OH Proj. No. 7015.600

D5413 SDG#: IRN04-10

Account No: 06948

AWD Technologies, Inc.

Building 111

Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-94-1061-COM

Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/B240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

46

See reverse side for explanation of symbols and abbreviations





LLI Sample No. SW 2208612

Collected: 10/22/94 at 10:55 by DNM

Submitted: 10/27/94 Reported: 11/14/94

Discard: 11/29/94

DHR-20C-02-DUP-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

D20C2 SDG#: IRN04-11

Account No: 06948

AWD Technologies, Inc.

Building III

Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-94-1061-COM

Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
0118	Moisture	12.7	0.5	% by wt.			
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:12:35 D 0002 4 0 0 440618
603 0.00 00028500 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

47



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations

* 22
3 *



LLI Sample No. SW 2208612

Collected: 10/22/94 at 10:55 by DNM

Submitted: 10/27/94 Reported: 11/14/94

Discard: 11/29/94

DHR-20C-02-DUP-102194 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

D20C2 SDG#: IRN04-11

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SWB46/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 110.	110.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster Laboratories
Where quality is a science.

Page: 1 of 3

LLI Sample No. SW 2208613

Collected: 10/22/94 at 12:15 by DNM

Submitted: 10/27/94 Reported: 11/14/94

Discard: 11/29/94

DHR-22B-13-DUP-102194 Grab Soil Sample
Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

D2213 SOG#: IRN04-12

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SWB46/8240A)			See Page 2			
0118	Moisture	16.3	0.5	% by wt.			
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:12:49 D 0002 4 0 0 440618
603 0.00 00028500 ASR000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations.





Lancaster Laboratories
Where quality is a science.

Page: 2 of 3

LLI Sample No. SW 2208613

Collected: 10/22/94 at 12:15 by DNM

Submitted: 10/27/94 Reported: 11/14/94

Discard: 11/29/94

DHR-22B-13-DUP-102194 Grab Soil Sample

Dow Nanging Rock - Ironton, OH Proj. No. 7015.600

D2213 SDG#: IRN04-12

Account No: 06948
AWO Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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See reverse side for explanation of symbols and abbreviations.



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Lancaster Laboratories

Where quality is a science.

Page: 1 of 3

LLI Sample No. SW 2208614

Collected: 10/22/94 at 09:20 by ONM

Submitted: 10/27/94 Reported: 11/14/94

Discard: 11/29/94

DHR-20A-46-DUP-102194 Grab Soil Sample
Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

D2A46 SDG#: IRN04-13*

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
0118	Moisture	18.3	0.5	% by wt.			
9001	Styrene	40.	5.	ug/kg	49.	6.	

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:13:02 D 0002 4 0 0 440618
603 D.00 00028500 ASR000

Respectfully submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations.





LLI Sample No. SW 2208614

Collected: 10/22/94 at 09:20 by DNM

Submitted: 10/27/94 Reported: 11/14/94

Discard: 11/29/94

DHR-20A-46-DUP-102194 Grab Soil Sample
Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

D2A46 SDG#: IRN04-13*

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	67.	5.	ug/kg	82.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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APPENDIX B
SUPPORT DOCUMENTATION

DOW ENVIRONMENTAL, INC.
DDW-HANGING ROCK
SDG# IRN04-01
FIELD DUPLICATE RESULTS

Compound	DHR-22B-13-102294	DHR-22B-13-DUP-102194	Control Limit
Acrylonitrile (ug/kg)	< 120	< 120	+/- 4 X CRDL
Methylene Chloride (ug/kg)	< 6	< 6	+/- 4 X CRDL
Ethylbenzene (ug/kg)	< 6	< 6	+/- 4 X CRDL
Styrene (ug/kg)	< 6	< 6	+/- 4 X CRDL
Barium (mg/kg)	60	NA	
Moisture (% by wt.)	16.3	16.3	+/- 50%

Analysis Request/ Environmental Services Chain of Custody



For LLI use only
 Acct. # 6947 Sample # 2207738-61
 2207762-73

Please print. Instructions on reverse side correspond with circled numbers.

Client: AWD Technologies Acct. #:
 Project Name: Exxon PWSID #:
 Project Manager: Kris Kosak PO #:
 Sampler: D. Martinek Quote #:
 Name of state where samples were collected: MD

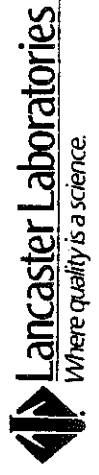
Matrix (4)
 Total # of Containers
 For LLI use only
 FSC: 10a225D
 SCR #: 10a225D

Sample Identification	Date Collected	Time Collected	Grab	Composite	Water	NPDES	Potable	Other	Remarks	Received by	Date	Time
DHR-23C-13DUP-102291	10/22/91	11:15	X		X							
DHR-23D-13-102291	10/22/91	12:00	X		X				HOLD			
DHR-23B-13-102291	10/22/91	12:15	X		X							
DHR-23B-13DUP-102291	10/22/91	12:15	X		X							
DHR-23C-13-102291	10/22/91	12:30	X		X				HOLD			
DHR-24-46-102291	10/22/91	13:10	X		X							
DHR-21B-13-102291	10/22/91	12:10	X		X							
DHR-16A-21-102291	10/22/91	12:50	X		X							
DHR-21B-13DUP-102291	10/22/91	12:10	X		X							
DHR-23C-13DUP-102291	10/22/91	12:30	X		X				HOLD			

Turnaround Time Requested (TAT) (please circle): Normal Rush
 (Rush TAT is subject to LLI approval and surcharge.) 1-2-3-4-5-6-7
 Date results are needed:
 Rush results requested by (please circle): Phone Fax
 Phone #: 412 788 3717 Fax #:
 Relinquished by: Andrew Miller Date: 10/24/91 Time: 11:00
 Relinquished by: [Signature] Date: 10/24/91 Time: 10:00
 Relinquished by: [Signature] Date: 10/24/91 Time: 10:00
 Relinquished by: [Signature] Date: 10/24/91 Time: 10:00
 Relinquished by: [Signature] Date: 10/24/91 Time: 10:00
 Relinquished by: [Signature] Date: 10/24/91 Time: 10:00

8 Data Package Options (please circle if requested)

QC Summary	GLP	SDG Complete?	Yes	No
Type I (Tier I)	Other			
Type II (Tier II)		Site-specific QC required?	Yes	No
Type III (NJ Red. Del.)		(If yes, indicate QC sample and submit triplicate volume)		
Type IV (CLP)		Internal Chain of Custody required?	Yes	No



For LLI use only
 Acct. # 6948 Sample # 2207738-61
 2207762-73

Please print. Instructions on reverse side correspond with circled numbers.

Client: AWD TECHNOLOGY Acct. # _____

Project Name: IRRAWADDY PWSID #: _____

Project Manager: Chris McCosker P.O. # _____

Sampler: D. MARTINEZ Quote #: _____

Name of State where samples were collected: INDONESIA

Sample Identification	Date Collected	Time Collected	Matrix			Total # of Containers	Analyses Requested	Remarks
			Soil	Potable	NPDES			
DHR-20C-24MS-102294	10/22/94	1010	X			1		
DHR-19A-24DUP-102294	10/22/94	0910	X			1		
DHR-20B-24DUP-102294	10/22/94	0935	X			1		
DHR-20D-68-102294-1	10/22/94	1055	X			2		HOLD
DHR-16MSD-24-102294-1	10/22/94	1110	X			3		
DHR-43B-02DUP-102294	10/22/94	1105	X			2		
DHR-43B-02-102294	10/22/94	1105	X			2		
DHR-43C-02-102294	10/22/94	1100	X			2		
DHR-23B-13-102294-1	10/22/94	1130	X			2		
DHR-23C-13-102294-1	11/15	1145	X			2		

Turnaround Time Requested (TAT) (please circle): Normal Rush

(Rush TAT is subject to LLI approval and surcharge.) 122 CONSTRUCTION

Date results are needed: _____

Rush results requested by (please circle): Phone Fax

Phone #: 412 766 2717 Fax #: _____

Data Package Options (please circle if requested)

QC Summary: ☒ GLP ☐ Other

Type I (Tier I) _____

Type II (Tier II) _____

Type III (NJ Red. Del.) _____

Type IV (CLP) _____

SDG Complete? Yes No

Site-specific QC required? Yes No

(If yes, indicate QC sample and submit triplicate volume.)

Internal Chain of Custody required? Yes No

Relinquished by: Andrew Miller Date: 10/22/94 Time: 1400

Relinquished by: [Signature] Date: 10/22/94 Time: 1200

Relinquished by: _____ Date: _____ Time: _____

Relinquished by: _____ Date: _____ Time: _____

Relinquished by: _____ Date: _____ Time: _____

Received by: _____ Date: _____ Time: _____

Received by: FEDEx Date: 10/24/94 Time: 1030

Received by: _____ Date: _____ Time: _____

Received by: X. M. Duta Date: 10-23-94 Time: 0934



For LLI use only
 Acct. # 6948 Sample # 2207694-14

2207738 -61
 2207762 -73

Please print. Instructions on reverse side correspond with circled numbers.

Client: AWD TECHNOL Acct. # 2207694-14

Project Name: IRONSTON PWSID #: _____

Project Manager: KRIS MCCOSKIE PO # _____

Sampler: D. MARTINEZ Quote #: _____

Name of state where samples were collected: KANSAS

For LLI use only

FSC: _____

SCR #: 1062250

Sample Identification	Date Collected	Time Collected	Matrix			Total # of Containers	Analysis Requested	Remarks	Temperature of samples upon receipt (if requested)
			Water	Soil	Other				
DHR-19A-24-102294	102294	0910	X			2			
DHR-20B-68-102294	102294	0945	X			2			
DHR-20B-46-102294	102294	0940	X			2			
DHR-20C-02-102294	102294	0955	X			2			
DHR-20C-02-102294	102294	0955	X			2			
DHR-20C-24-102294	102294	1010	X			2			
DHR-20D-46-102294	102294	1015	X			2			
DHR-20D-24-102294	102294	1010	X			2			
DHR-20D-02-102294	102294	1030	X			2			

Turnaround Time Requested (TAT) (please circle): 1-2-3-4-5-6-7-8-9-10-11-12

Rush results are needed: YES

Rush results requested by (please circle): PHONE Fax _____

Phone #: 412 786 3712 Fax #: _____

Relinquished by: Andrew Muller Date: 10/26/14 Time: 1400

Relinquished by: [Signature] Date: 10/27/14 Time: 1200

Relinquished by: _____ Date: _____ Time: _____

Relinquished by: _____ Date: _____ Time: _____

Relinquished by: _____ Date: _____ Time: _____

Data Package Options (please circle if requested)

QC Summary GLP _____ Other _____

Type I (Tier I) _____

Type II (Tier II) _____

Type III (NJ Red. Oel.) _____

Type IV (GLP) _____

SDG Complete? Yes _____ No _____

Site-specific QC required? Yes _____ No _____
(If yes, indicate QC sample and submit triplicate volume.)

Internal Chain of Custody required? Yes _____ No _____



A Subsidiary of
The Dow Chemical Company

PGH-95-CDY-0031

DATE January 10, 1995

TO Mr. Kristian Macoskey
Dow Environmental, Inc.
Pittsburgh, Pennsylvania

FROM Cheryl Young
Dow Environmental, Inc.

SUBJECT Data Validation of:
Volatile Organic Chemicals and Barium

Re: The Dow Chemical Company
Dow Hanging Rock - Ironton, Ohio

Lancaster Laboratories Sample Numbers: 2207774-2207779
2210718-2210734

SDG#: IRN05

<u>Soil Samples:</u>	DHR-20A-46-102294	DHR-53D-35-102194
	DHR-20A-46-102294DUP	DHR-20B-68-102294
	DHR-20B-24-102294	DHR-20D-46-102294
	DHR-8B-46-102094	DHR-20D-24-102294
	DHR-8D-02-102094	DHR-20D-02-102294
	DHR-8D-24-102094	DHR-20D-68-102294
	DHR-8B-02-102094	DHR-43C-02-102294
	DHR-8B-24-102094	DHR-53D-57-102294
	DHR-8D-46-102094	DHR-20C-68-102294
	DHR-53D-79-102194	
	DHR-53D-13-102194	

Water Sample: DHR-TBLK (Trip Blank)

Field Duplicates: Sample DHR-20A-46-102294DUP is a field duplicate of
sample DHR-20A-46-102294.

AWD Technologies, Inc.

Penn Center West Building III Suite 300 Pittsburgh Pennsylvania 15276 Telephone 412 788 2717 Fax 412 788 1316

PGH-95-CDY-0031
Mr. Kristian Macoskey
Dow Environmental Inc.
January 10, 1995 - Page 2

Overview

This set of samples collected on October 20, 21, and 22, 1994, containing twenty (20) soil samples, including one field duplicate pair, and one (1) water sample included as a trip blank, were analyzed for volatile organic chemicals by EPA SW-846 Method 8240 and Barium using Method 6010A. The percent moisture was determined by using modified Method 160.3 for each environmental sample.

Summary

All compounds were successfully analyzed in all samples. The organic analytical data were evaluated by the following quality assurance/quality control (QA/QC) parameters where applicable: holding times, initial and continuing calibrations, system monitoring compound/surrogate spike recoveries, method blanks, field duplicates, matrix spike/matrix spike duplicates (MS/MSDs), laboratory control samples, analytical sequence, compound identification and quantitation, and transcription.

The inorganic analytical data were evaluated by the following quality assurance/quality control (QA/QC) parameters where applicable: technical holding times, initial and continuing calibrations, laboratory blanks, ICP interference check samples, matrix and analytical spike recoveries, laboratory duplicates, laboratory control samples, ICP serial dilutions, and transcription.

Validated sample analysis results are listed on the attached data summary form. Areas of concern with respect to data quality and usability are discussed below.

Minor Issues

The system monitoring compound (surrogate) 4-Bromofluorobenzene has a recovery greater than quality control limits in the dilution of sample DHR-8B-46-102094. Detected volatile target compounds were qualified "J".

Percent recoveries and Relative Percent Differences (RPDs) were outside of quality control limits for ethylbenzene and styrene in the matrix spike/matrix spike duplicate (MS/MSD) sample. No qualification of data was indicated since qualification is not based on MS/MSD criteria alone.

PGH-95-CDY-0031
Mr. Kristian Macoskey
Dow Environmental Inc.
January 10, 1995 - Page 3

Notes

Comparisons of the field duplicate pair DHR-20A-46-102294 and DHR-20A-46-102294DUP were within quality control limits. These comparisons are included in the support documentation section of this report.

Please note that samples DHR-8B-46-102094 and DHR-53D-79-102194 were diluted for the volatile analyses. Results from these diluted samples have been reported on the Form Is by the laboratory.

The laboratory reported that a secondary ion quantitation was performed on 4-bromofluorobenzene in sample DHR-8B-46-102094 by using m/z 174 instead of m/z 95 due to interference with the primary ion.

Information Regarding Report Content

Attachments:

1. Glossary of data qualifier codes.
2. Data Summary. This may include:
 - a) All positive results with qualifier codes, if applicable.
 - b) All estimated detection limits qualified with UJ.
3. Appendix A - Results as Reported by the Laboratory.
4. Appendix B - Support Documentation includes details to support the statements made in this report.

GLOSSARY OF DATA QUALIFIER CODES

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds)

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

(NO CODE) = Confirmed identification.

R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. The result is unusable.

CODES RELATED TO QUANTITATION

(can be used for positive results and sample quantitation limits)

J = Analyte present. Reported value may not be accurate or precise.

UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

DATA SUMMARY

DOW ENVIRONMENTAL, INC.
DOW - HANGING RDCK
IRONTON - GRAB SOIL SAMPLES / SDG # IRN05-01BK
DATA SUMMARY

Compound	DHR-20A-46-102294	DHR-20A-46-102294Dup	DHR-20B-24-102294	DHR-8B-46-102094	DHR-8D-02-102094	DHR-8D-24-102094	DHR-8B-02-102094
Acrylonitrile (ug/kg)	< 120		< 120	< 130	< 120	< 120	< 120
Methylene Chloride (ug/kg)	< 6		< 6	< 6	< 6	< 6	< 6
Ethylbenzene (ug/kg)	97		< 6	< 6	< 6	< 6	< 6
Styrene (ug/kg)	64		< 6	1,500 J	< 6	< 6	< 6
Barium (mg/kg)	100	94	71	121	80	106	73
Moisture (% by wt.)	18.3	18.1	16.7	21.4	14.1	19.6	14.3

Compound	DHR-8B-24-102094	DHR-8D-46-102094	DHR-53D-79-102194	DHR-53D-13-102194	DHR-53D-35-102194	DHR-20B-68-102294	DHR-20D-46-102294
Acrylonitrile (ug/kg)	< 120	< 130	190	< 120	< 120	< 130	< 120
Methylene Chloride (ug/kg)	< 6	< 6	40	< 6	< 6	< 6	< 6
Ethylbenzene (ug/kg)	200	< 6	870	10	120	27	< 6
Styrene (ug/kg)	< 6	< 6	490	< 6	63	53	< 6
Barium (mg/kg)	153	138	129	79	85	120	100
Moisture (% by wt.)	19.8	20.5	19.6	15.2	16.9	20.9	17.0

Compound	DHR-20D-24-102294	DHR-20D-02-102294	DHR-20D-68-102294	DHR-43C-02-102294	DHR-53D-57-102194	DHR-20C-68-102294	DHR-TBLK (Trip Blank)
Acrylonitrile (ug/kg)	< 120	< 110	< 120	< 110	270	< 120	< 100
Methylene Chloride (ug/kg)	< 6	< 6	< 6	< 6	18	< 6	< 5
Ethylbenzene (ug/kg)	< 6	< 6	< 6	< 6	260	< 6	< 5
Styrene (ug/kg)	< 6	< 6	< 6	< 6	300	< 6	< 5
Barium (mg/kg)	68	95	108	101	125	144	NA
Moisture (% by wt.)	15.5	10.9	19.7	10.1	18.0	19.4	NA

APPENDIX A
RESULTS AS REPORTED BY THE LABORATORY



LLI Sample No. SW 2207774
Collected: 10/22/94 at 09:20 by DM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-20A-46-102294 Unspiked Grab Soil Sample

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
20A46 SDG#: IRN05-01BK

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	81.3	9.8	mg/kg	100.	12.
9001	Styrene	52.	5.	ug/kg	64.	6.
0111	Moisture	18.3	0.5	% by wt.		
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.					

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:54:03 D 0002 6 0 118283 440405
603 25.00 00033600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

33



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





Lancaster Laboratories

Where quality is a science.

Page: 2 of 3

LLI Sample No. SW 2207774

Collected: 10/22/94 at 09:20 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20A-46-102294 Unspiked Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20A46 SDG#: IRN05-01BK

Account No: 06948

AWD Technologies, Inc.

Building III

Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-94-1061-COM

Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	79.	5.	ug/kg	97.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

34



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations.



* 22
9.13



LLI Sample No. SW 2207775

Collected: 10/22/94 at 09:20 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20A-46-102294 Matrix Spike Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20A46 SDG#: IRN05-01MS

Account No: 06948

AWD Technologies, Inc.

Building III

Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-94-1061-COM

Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	285.	10.	mg/kg	348.	12.	
9001	Styrene	50.	5.	ug/kg	61.	6.	
0118	Moisture	18.3	0.5	% by wt.			

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:54:14 0 0002 6 0 118283 440405
603 25.00 00032400 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

35



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





LLI Sample No. SW 2207775

Collected: 10/22/94 at 09:20 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20A-46-102294 Matrix Spike Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20A46 SDG#: IRN05-01MS

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	130.	100.	ug/kg	160.	120.	
3440	Methylene Chloride	26.	5.	ug/kg	32.	6.	
3458	Ethylbenzene	63.	5.	ug/kg	77.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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36





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Page: 1 of 3

LLI Sample No. SW 2207776

Collected: 10/22/94 at 09:20 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20A-46-102294 Matrix Spike Duplicate Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20A46 SDG#: IRN05-01MSD

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	267.	10.	mg/kg	527.	12.	
9001	Styrene	57.	5.	ug/kg	70.	6.	
0118	Moisture	18.3	0.5	% by wt.			

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:54:24 D 0002 60 118283 440405
603 25.00 00032400 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

37



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations



* 2.
9 *



LLI Sample No. SW 2207776

Collected: 10/22/94 at 09:20 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20A-46-102294 Matrix Spike Duplicate Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

20A46 SDG#: IRN05-01MSD

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	130.	100.	ug/kg	160.	120.
3440	Methylene Chloride	25.	5.	ug/kg	31.	6.
3458	Ethylbenzene	72.	5.	ug/kg	88.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

38



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





LLI Sample No. SW 2207777
Collected: 10/22/94 at 09:20 by DM

Submitted: 10/25/94 Reported: 11/14/94
Discard: 1/14/95

DHR-20A-46-102294 Duplicate Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
20A46 SDG#: IRN05-010UP

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1646	Barium	77.1	9.8	mg/kg	94.	12.
0118	Moisture	18.3	0.5	% by wt.		
0121	Moisture Duplicate	18.1	0.5	% by wt.		

The duplicate moisture value is provided to assess the precision of the moisture test. For comparability purposes, the initial moisture determination is the value used to perform dry weight calculations.

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:54:33 D 0002 6 D 118283 440405
603 25.00 00005100 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

39



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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Page: 1 of 3

LLI Sample No. SW 2207778

Collected: 10/22/94 at 09:35 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-208-24-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
20824 SDG#: IRN05-02

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	59.	10.	mg/kg	71.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	16.7	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
D4:54:4D D D0D2 6 D 118283 440405
603 25.00 D0033600 ASRD00

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
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717-656-2301

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*20
9.



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Page: 2 of 3

LLI Sample No. SW 2207778

Collected: 10/22/94 at 09:35 by DM

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-208-24-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600
20824 SDG#: IRN05-02

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/B240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

41



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See reverse side for explanation of symbols and abbreviations





LLI Sample No. SW 2210718

Collected: 10/20/94 at 11:55 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-88-46-102094 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

88-46 SDG#: IRN05-04

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
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CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT DF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	94.8	9.5	mg/kg	121.	12.
9001	Styrene	1,200.	5.	ug/kg	1,500.	6.
0111	Moisture	21.4	0.5	% by wt.		
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc. ATTN: Mr. Kris McCoskey
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:52:05 D 0002 17 0 118283 441106
603 25.00 00034600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations.





LLI Sample No. SW 2210718

Collected: 10/20/94 at 11:55 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-88-46-102094 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

88-46 SOG#: IRN05-04

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
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		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 130.	130.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

45





LLI Sample No. SW 2210719

Collected: 10/20/94 at 09:35 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8D-02-102094 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

8D-02 SOG#: IRN05-05

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

02-02 300W: 11005-03

CAT ND.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	69.	10.	mg/kg	80.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	14.1	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:52:16 D 0002 17 0 118283 441106
603 25.00 00034600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations





LLI Sample No. SW 2210719

Collected: 10/20/94 at 09:35 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8D-02-102094 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

8D-02 SDG#: IRN05-05

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

47



Lancaster Laboratories, Inc.
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See reverse side for explanation of symbols and abbreviations.





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Page: 1 of 3

LLI Sample No. SW 2210720

Collected: 10/20/94 at 09:40 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8D-24-102094 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

8D-24 SDG#: IRN05-06

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
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CAT ND.	ANALYSIS NAME	AS RECEIVED			UNITS	DRY WEIGHT		
		RESULTS	LIMIT OF	QUANTITATION		RESULTS	LIMIT OF	QUANTITATION
1177	Purgeables (SW846/8240A)				See Page 2			
1646	Barium	85.	10.		mg/kg	106.	12.	
9001	Styrene	< 5.	5.		ug/kg	< 6.	6.	
0111	Moisture	19.6	0.5		% by wt.			

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

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1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:52:26 D 0002 17 0 118283 441106
603 25.00 00034600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

46



Lancaster Laboratories, Inc.
2425 New Holland Pike
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717-656-2301

See reverse side for explanation of symbols and abbreviations



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Page: 2 of 3

LLI Sample No. SW 2210720

Collected: 10/20/94 at 09:40 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8D-24-102094 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

8D-24 SDG#: IRN05-06

Account No: 06948
AWD Technologies, Inc.
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P.O. SC-941061-COM
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AS RECEIVED

DRY WEIGHT

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

49



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations



*201
9-1-95



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Page: 1 of 3

LLI Sample No. SW 2210721

Collected: 10/20/94 at 11:45 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8B-02-102094 Grab Soil Sample

Dow Hanging Rock - Ironton, OH

8B-02 SDG#: IRN05-07

Account No: 06948

AWD Technologies, Inc.

Building III

Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-941061-COM

Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/824DA)			See Page 2			
1646	Barium	63.	10.	mg/kg	73.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	14.3	0.5	% by wt.			

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative

Eileen R. Hostetler

at (717) 656-2301

05:52:37 D 0002 17 0

118283 441106

603 25.00 00034600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

56



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations



*20
9 11



LLI Sample No. SW 2210721

Collected: 10/20/94 at 11:45 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8B-02-102094 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.D. SC-941D61-COM
Rel.

8B-02 SDG#: IRN05-07

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

51



Lancaster Laboratories, Inc.
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717-656-2301

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100-
2-13



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Page: 1 of 3

LLI Sample No. SW 2210722
Collected: 10/20/94 at 12:15 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

OHR-88-24-102094 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

88-24 SDG#: IRN05-08

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED				DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS		RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	123.	9.8	mg/kg		153.	12.
9001	Styrene	< 5.	5.	ug/kg		< 6.	6.
0111	Moisture	19.8	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:52:47 D 0002 17 0 118283 441106
603 25.00 00034600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations



* 22
9 11



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Page: 2 of 3

LLI Sample No. SW 2210722

Collected: 10/20/94 at 12:15 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8B-24-102094 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

8B-24 SDG#: IRN05-08

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT			LIMIT OF			LIMIT OF
NO.	ANALYSIS NAME	RESULTS	QUANTITATION	UNITS	RESULTS	QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	160.	5.	ug/kg	200.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

53



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations



*22
9-3



LLI Sample No. SW 2210723

Collected: 10/20/94 at 09:45 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8D-46-102094 Grab Soil Sample

Dow Hanging Rock - Ironton, OH

8D-46 SDG#: IRN05-09

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
1177	Purgeables (SW846/8240A)			See Page 2		
1646	Barium	110.	9.5	mg/kg	138.	12.
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.
0111	Moisture	20.5	0.5	% by wt.		
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostettler at (717) 656-2301
05:53:00 D 0002 17 0 118283 441106
603 25.00 00034600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

54



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301





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Page: 2 of 3

LLI Sample No. SW 2210723

Collected: 10/20/94 at 09:45 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-8D-46-1D2094 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

8D-46 SDG#: IRN05-09

Account No: 06948.
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.D. SC-941061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 130.	130.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

55

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Page: 1 of 3

LLI Sample No. SW 2210724
Collected: 10/21/94 at 14:00 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-53D-79-102194 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

53079 SDG#: IRN05-10

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-CDM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			UNITS	DRY WEIGHT		
		RESULTS	LIMIT OF	QUANTITATION		RESULTS	LIMIT OF	QUANTITATION
1177	Purgeables (SW846/B240A)				See Page 2			
1646	Barium	104.	10.		mg/kg	129.	12.	
9001	Styrene	390.	5.		ug/kg	490.	6.	
0111	Moisture	19.6	0.5		% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:53:10 D 0002 17 D 118283 441106
603 25.00 00034600 ASR000



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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721
917



LLI Sample No. SW 2210724

Collected: 10/21/94 at 14:00 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53D-79-102194 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

53D79 SDG#: IRN05-10

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941D61-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	150.	100.	ug/kg	190.	120.
3440	Methylene Chloride	32.	5.	ug/kg	40.	6.
3458	Ethylbenzene	700.	5.	ug/kg	870.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

57



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Lancaster, PA 17601-5994
717-656-2301

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LLI Sample No. SW 2210725

Collected: 10/21/94 at 13:40 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-530-13-102194 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

53013 SDG#: IRN05-11

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	67.2	9.8	mg/kg	79.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	15.2	0.5	% by wt.			

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostettler at (717) 656-2301
05:53:21 0 0002 17 0 118283 441106
603 25.00 00034600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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LLI Sample No. SW 2210725

Collected: 10/21/94 at 13:40 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53D-13-102194 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

53D13 SDG#: IRN05-11

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	9.	5.	ug/kg	10.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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LLI Sample No. SW 2210726

Collected: 10/21/94 at 13:45 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53D-35-102194 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

53D35 SDG#: IRN05-12

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			UNITS	DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION			RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SWB46/8240A)				See Page 2			
1646	Barium	71.	10.		mg/kg	85.	12.	
9001	Styrene	52.	5.		ug/kg	63.	6.	
0111	Moisture	16.9	0.5		% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.								

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:53:32 D 0002 17 0 118283 441106
603 25.00 00034600 ASR000



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717-656-2301

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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Page: 2 of 3

LLI Sample No. SW 2210726

Collected: 10/21/94 at 13:45 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-53D-35-102194 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

53D35 SDG#: IRND5-12

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	99.	5.	ug/kg	120.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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LLI Sample No. SW 2210727

Collected: 10/22/94 at 09:45 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-208-68-102294 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

Account No: 06948
AWD Technologies, Inc.
Building III
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Pittsburgh, PA 15276

P.O. SC-941061-COM
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20868 SDG#: IRN05-13

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SWB46/B240A)			See Page 2			
1646	Barium	95.	10.	mg/kg	120.	13.	
9001	Styrene	42.	5.	ug/kg	53.	6.	
0111	Moisture	20.9	0.5	% by wt.			

"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:53:44 D 0002 17 0 118283 441106
603 25.00 00034600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



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Lancaster, PA 17601-5994
717-656-2301

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LLI Sample No. SW 2210727

Collected: 10/22/94 at 09:45 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

OHR-20B-68-102294 Grab Soil Sample

Oow Hanging Rock - Ironton, OH

20B68 SOG#: IRN05-13

Account No: 06948
AWD Technologies, Inc.
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Pittsburgh, PA 15276

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		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 130.	130.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	21.	5.	ug/kg	27.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostettler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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LLI Sample No. SW 2210728

Collected: 10/22/94 at 10:45 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-200-46-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH

20046 SDG#: IRN05-14

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/824DA)			See Page 2			
1646	Barium	83.	10.	mg/kg	100.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	17.0	0.5	% by wt.			

"Moisture" represents the loss in weight of the sample after oven drying at 105 - 105 degrees Celsius.

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:53:54 D 0002 17 0 118283 441106
603 25.00 00034600 ASR000



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster PA 17601-5994
717-656-2301

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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LLI Sample No. SW 2210728

Collected: 10/22/94 at 10:45 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20D-46-102294 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

20D46 SDG#: 1RN05-14

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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LLI Sample No. SW 2210729
Collected: 10/22/94 at 10:40 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-200-24-102294 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

20D24 SDG#: IRN05-15

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	UNITS
1177	Purgeables (SW846/B240A)			See Page 2			
1646	Barium	58.	10.	mg/kg	68.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
D111	Moisture	15.5	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

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ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostettler at (717) 656-2301
05:54:05 D 0002 17 0 118283 441106
603 25.00 00034600 ASR000



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

66





LLI Sample No. SW 2210729

Collected: 10/22/94 at 10:40 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20D-24-102294 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

20D24 SDG#: IRN05-15

Account No: 06948
AWD Technologies, Inc.
Building 111
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Pittsburgh, PA 15276

P.D. SC-941061-COM
Rel.

2024 SGG: TKN03-13		AS RECEIVED			DRY WEIGHT		
CAT			LIMIT OF			LIMIT OF	
NO.	ANALYSIS NAME	RESULTS	QUANTITATION	UNITS	RESULTS	QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Page: 1 of 3

LLI Sample No. SW 2210730

Collected: 10/22/94 at 10:30 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

DHR-20D-02-102294 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
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20002 SDG#: IRN05-16

CAT NO.	ANALYSIS NAME	AS RECEIVED			UNITS	DRY WEIGHT		
		RESULTS	LIMIT OF	QUANTITATION		RESULTS	LIMIT OF	QUANTITATION
1177	Purgeables (SW846/824DA)				See Page 2			
1646	Barium	84.7	9.5		mg/kg	95.	11.	
9001	Styrene	< 5.	5.		ug/kg	< 6.	6.	
0111	Moisture	10.9	0.5		% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.								

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1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Mostetler at (717) 656-2301
05:54:15 D 0002 17 D 118283 441106
603 25.00 00034600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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2425 New Holland Pike
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717-656-2301

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Page: 2 of 3

LLI Sample No. SW 2210730

Collected: 10/22/94 at 10:30 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20D-02-102294 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

20002 SOG#: 1RN05-16

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/B240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 110.	110.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Page: 1 of 3

LLI Sample No. SW 2210731

Collected: 10/22/94 at 10:55 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20D-68-102294 Grab Soil Sample

Dow Hanging Rock - Ironton, OH

20D68 SDG#: IRN05-17

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	87.	10.	mg/kg	108.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	19.7	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostettler at (717) 656-2301
05:54:25 D 0002 17 0 118283 441106
603 25.00 00034600 ASR000



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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LLI Sample No. SW 2210731

Collected: 10/22/94 at 10:55 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-200-68-102294 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

20068 SDG#: IRN05-17

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301

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LLI Sample No. SW 2210732

Collected: 10/22/94 at 11:00 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-43C-02-102294 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

43C02 SDG#: IRN05-18

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SWB46/8240A)			See Page 2			
1646	Barium	91.	10.	mg/kg	101.	11.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	10.1	0.5	% by wt.			
	"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.						

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:54:35 D 0002 17 0 118283 441106
603 25.00 00034600 ASR000

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates



Lancaster Laboratories, Inc.
2425 New Holland Pike
Lancaster, PA 17601-5994
717-656-2301





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Page: 2 of 3

LLI Sample No. SW 2210732

Collected: 10/22/94 at 11:00 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-43C-02-102294 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

43C02 SDG#: IRN05-18

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT	
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SWB46/B240A)						
3439	Acrylonitrile	< 100.	100.	ug/kg	< 110.	110.
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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See reverse side for explanation of symbols and abbreviations





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Page: 1 of 3

LLI Sample No. SW 2210733

Collected: 10/21/94 at 13:50 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-53D-57-102194 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

53D57 SDG#: IRN05-19

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	102.	10.	mg/kg	125.	12.	
9001	Styrene	250.	5.	ug/kg	300.	6.	
0111	Moisture	18.0	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

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1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
05:54:46 D 0002 17 0 118283 441106
603 25.00 00034600 ASR000



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Ramona V. Layman, Group Leader
ICP Metals/Leachates

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Page: 2 of 3

LLI Sample No. SW 2210733

Collected: 10/21/94 at 13:50 by DM

Submitted: 10/24/94 Reported: 11/14/94
Discard: 1/14/95

OHR-530-57-102194 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

53D57 SDG#: IRN05-19

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

		AS RECEIVED			DRY WEIGHT	
CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION
Purgeables (SW846/8240A)						
3439	Acrylonitrile	220.	100.	ug/kg	270.	120.
3440	Methylene Chloride	15.	5.	ug/kg	18.	6.
3458	Ethylbenzene	210.	5.	ug/kg	260.	6.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles



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Page: 1 of 3

LLI Sample No. SW 2210734

Collected: 10/22/94 at 10:20 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20C-68-102294 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

20C68 SDG#: IRN05-20*

Account No: 06948

AWD Technologies, Inc.

Building III

Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-941061-COM

Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED			DRY WEIGHT		
		RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
1177	Purgeables (SW846/8240A)			See Page 2			
1646	Barium	116.	9.6	mg/kg	144.	12.	
9001	Styrene	< 5.	5.	ug/kg	< 6.	6.	
0111	Moisture	19.4	0.5	% by wt.			
"Moisture" represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius.							

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
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05:54:56 D 0002 17 0 118283 441106
603 25.00 00034600 ASR000

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Lancaster, PA 17601-5994
717-656-2301

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22
9.1



LLI Sample No. SW 2210734

Collected: 10/22/94 at 10:20 by DM

Submitted: 10/24/94 Reported: 11/14/94

Discard: 1/14/95

DHR-20C-68-102294 Grab Soil Sample
Dow Hanging Rock - Ironton, OH

20C68 SDG#: IRN05-20*

Account No: 06948
AWD Technologies, Inc.
Building III
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-941061-COM
Rel.

		AS RECEIVED			DRY WEIGHT		
CAT ND.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS	RESULTS	LIMIT OF QUANTITATION	
Purgeables (SW846/8240A)							
3439	Acrylonitrile	< 100.	100.	ug/kg	< 120.	120.	
3440	Methylene Chloride	< 5.	5.	ug/kg	< 6.	6.	
3458	Ethylbenzene	< 5.	5.	ug/kg	< 6.	6.	

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster, PA 17601-5994
717-656-2301

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LLI Sample No. WW 2207779

Collected:

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-TBLK Trip Blank Water Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

TBSDH SOG#: IRN05-03BL

Account No: 06948
AWD Technologies, Inc.
Building 111
Penn Center West, Suite 300
Pittsburgh, PA 15276

P.O. SC-94-1061-COM
Rel.

AS RECEIVED

CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS
1508	Purgeables (SW846/8240A)			
9001	Styrene	< 5	5.	See Page 2 ug/l

1 COPY TO AWD Technologies, Inc.
1 COPY TO Data Package Group

ATTN: Mr. Kris McCoskey

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301
04:54:50 D 0002 6 0 118283 440405
603 0.00 00027000 ASR000



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717-656-2301

Respectfully Submitted
Ramona V. Layman, Group Leader
ICP Metals/Leachates

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Page: 2 of 3

LLI Sample No. WW 2207779

Collected:

Submitted: 10/25/94 Reported: 11/14/94

Discard: 1/14/95

DHR-TBLK Trip Blank Water Sample

Dow Hanging Rock - Ironton, OH Proj. No. 7015.600

TBSDH SDG#: IRN05-038L

Account No: 06948

AWD Technologies, Inc.

Building III

Penn Center West, Suite 300

Pittsburgh, PA 15276

P.O. SC-94-1061-COM

Rel.

AS RECEIVED

CAT NO.	ANALYSIS NAME	RESULTS	LIMIT OF QUANTITATION	UNITS
------------	---------------	---------	--------------------------	-------

Purgeables (SW846/B240A)

3496	Acrylonitrile	< 100.	100.	ug/l
3497	Methylene Chloride	< 5.	5.	ug/l
3526	Ethylbenzene	< 5.	5.	ug/l

The GC/MS volatile sample was preserved with 1 + 1 HCl to pH < 2.

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2301

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster, PA 17601-5994
717-656-2301

See reverse side for explanation of symbols and abbreviations



* 22
9 13

APPENDIX B
SUPPORT DOCUMENTATION

2B

LAB NAME: LANCASTER LABS

SDG No: IRN05

LEVEL: LOW

	EPA SAMPLE NO.	S1 (DCE) #	S2 (TOL) #	S3 (BFB) #	OTHER	TOT OUT
01	20A46	96	100	97		
02	20A46MS	100	101	104		
03	20A46MSD	102	103	100		
04	20B24	101	101	102		
05	8B-46	94	103	75		
06	8B-46DL	95	101	116		
07	8D-02	98	110	94		
08	8D-24	94	100	100		
09	8B-02	97	104	98		
10	8B-24	97	104	105		
11	8D-46	94	98	98		
12	53D79	94	96	97		
13	53D79DL	97	96	99		
14	53D13	95	99	98		
15	53D35	99	104	102		
16	20B68	93	97	99		
17	20D46	92	99	95		
18	20D24	96	103	101		
19	20D02	93	102	90		
20	20D68	92	100	97		
21	43C02	94	100	94		
22	53D57	94	102	99		
23	20C68	94	100	99		
24						
25	LAB QC					
26	VBLKK03	99	99	98		
27	VBLKK08	97	98	100		
28	VBLKK09	91	97	96		
29	LCSLK70	102	101	98		

S1	(DCE)	=	1,2-Dichloroethane-d4	QC LIMITS
S2	(TOL)	=	Toluene-d8	70 - 121
S3	(BFB)	=	4-Bromofluorobenzene	81 - 117 84-138
				74 - 121 59-113

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

Lancaster Laboratories, Inc.
GC/MS Volatiles Matrix Spike/Spike Duplicate Recoveries

Unspiked: ^KCV01
20A46 2207774
Method: SPECIALS BY 1177
Instrument: HP03973

Matrix spike: ^KCV02
20A46MS 2207775
Matrix/Level: SL
Dilution Factor: 1.0

Spike Duplicate: ^KCV03
20A46MSD 2207776
Batch: K9430218C
% Moisture: 18

COMPOUND NAME	SPIKE LEVEL	US CONC UG/KG	MS CONC UG/KG	MSD CONC UG/KG	MS REC %	MSD REC %	RPD %	RANGE LOWER-UPPER	IN SPEC
Methylene Chloride	24.39	2.31	31.31	30.08	119	114	4	1-221	YES
Acrylonitrile	182.93	0.00	164.05	156.09	90	85	6	51-138	YES
Ethylbenzene	24.39	96.92	77.31	87.49	-80	-40	67	37-162	NO
Styrene	24.39	63.34	61.16	70.03	-9	27	-400	74-136	NO

N/C = Could not calculate

Lab Chronicle: _____ Ent. by _____

_____ Ver. by _____

* XRPD for this compound exceeds method specified limit.

DOW ENVIRONMENTAL, INC.

DOW-HANGING ROCK

SDG# IRN05-01BK

FIELD DUPLICATE RESULTS

Compound	DHR-20A-46-102294	DHR-20A-46-102294Dup	Control Limit
Acrylonitrile (ug/kg)	< 120	NA	
Methylene Chloride (ug/kg)	< 6	NA	
Ethylbenzene (ug/kg)	97	NA	
Styrene (ug/kg)	64	NA	
Barium (mg/kg)	100	94	+/- 50%
Moisture (% by wt.)	18.3	18.1	+/- 50%

**SUPPLEMENTAL PHASE IV
SAMPLING REPORT**

FOR

**FORMER DRUM STORAGE AREA
HANGING ROCK PLANT
IRONTON, OHIO**

PREPARED FOR

THE DOW CHEMICAL COMPANY

PREPARED BY

**DOW ENVIRONMENTAL INC.
PITTSBURGH, PENNSYLVANIA**

PROJECT NUMBER 7015.500

MARCH 1996

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TABLES

NUMBER

- | | |
|---|--|
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1.0 INTRODUCTION

This report, prepared by Dow Environmental Inc. (DEI), presents the results of Supplemental Phase IV soil sampling conducted adjacent to the old sewer line to the north of the Former (also referred to as Old) Drum Storage Area at The Dow Chemical Company (Dow) Hanging Rock plant in Ironton, Ohio. This phase of sampling performed during January of 1996 supplements previous sampling activities in and around the Former Drum Storage Area, with the most recent previous sampling performed during October 1994. In addition, this phase of sampling was performed in accordance with the DEI's October, 1995 Addendum to Sampling and Analysis Plan - Additional Sampling for Old Drum Storage Area, Hanging Rock Plant, Ironton, Ohio, and included the additional requirements requested by the Ohio Environmental Protection Agency (OEPA) in their October 16, 1995 and November 17, 1995 letters to Dow.

1.1 Background of Previous Field Investigations

Four phases of field sampling and analysis have previously been conducted at and near the Former Drum Storage Area. Phase I, performed in May 1992, consisted of surface soil sampling at 28 locations to define the horizontal extent of acrylonitrile (AN), ethylbenzene (EB), methylene chloride (MC), and styrene (ST). Phase II, also performed in 1992, involved soil excavation and confirmation sampling of two 16 foot by 16 foot areas. Phase III was performed in February 1993 as part of an effort outlined in the OEPA approved Closure Plan for the Former Drum Storage Area. During Phase III, headspace sampling was performed throughout the Former Drum Storage Area at various depths to define the vertical and horizontal extent of constituents in soil.

In May 1993, the Ohio Environmental Protection Agency (OEPA) indicated that Dow had agreed to amend the approved Closure Plan to include the February 1993 headspace data (OEPA, 1993a). The OEPA indicated that among other things, Dow should include a demonstration that the subsurface contamination could have been caused by a source other than the Former Drum Storage Area. A pipeline investigation was subsequently performed on July 21, 1993. This study indicated there was evidence that the process sewer line underlying the Former Drum Storage Area could be the source of AN, ST, and EB in soil. OEPA accepted Dow's interpretation of the subsurface contamination source on August 25, 1993 (OEPA, 1993b). At that time, OEPA recommended that

Dow submit a Closure Plan Modification. The Closure Plan Modification was submitted in September 1993 (AWD, 1993).

Comments on the Closure Plan Modification were received from OEPA, Division of Hazardous Waste Management (DHWM) in August 1994. Draft revisions to the Closure Plan Modification were submitted to the OEPA on August 29, 1994 (AWD, 1994). Following review of the draft revisions, the OEPA requested that the extent of contamination of the four previously-identified volatile organics plus barium be more closely defined. The Phase IV soil sampling was performed as approved by the OEPA DHWM. Samples were also collected to coincide with former headspace sampling to confirm the vertical extent of constituents in soil.

Based on the Phase IV investigation findings, OEPA concluded that additional sampling was required to assess the horizontal and vertical distribution of constituents in soil adjacent to the old sewer line to the north of the Former Drum Storage Area.

1.2 Sampling and Analysis Objective

This sampling and analysis event was designed to respond to the OEPA concerns regarding the Former Drum Storage Area and the process sewer pipe line. The DEI field activities included:

- Collection of additional soil samples to define the northern extent of constituents along the sewer line. Constituents analyzed for were AN, EB, MC, ST, and Barium.
- Collection of soil samples at location 53C to determine the vertical extent of constituents. Specifically, collection of three consecutive samples that resulted in non-detect field screening to include a confirmatory sample taken from the bottom of the boring and to be analyzed at an offsite laboratory.
- Interpretation of soil data to determine the extent of constituent concentration and whether constituents in soil reached groundwater.

To achieve these objectives, five soil borings were installed adjacent to the process sewer line at locations defined in DEI's October, 1995 Addendum to Sampling and Analysis Plan (SAP) (DEI, 1995a) (see Appendix A). The soil boring locations are shown on Figure 1. Soil samples

collected from the borings were field screened until low level or non-detect results were achieved at or below minimum prescribed sample depths outlined in the addendum to the SAP. Based on field screening results, confirmatory samples were collected for each soil boring location to determine the concentration of the target constituents in soil.

2.0 FIELD ACTIVITIES

This section details the field methods and procedures used to implement the additional sampling program for the process sewer line area to the north of the Old Drum Storage Area. The field work was performed on January 9 and 10, 1996. Philip Environmental Services Corporation of Groveport, Ohio was subcontracted to provide subsurface drilling services for the collection of soil samples. Ross Analytical Services, Inc. of Strongsville, Ohio provided analytical support for the project. Figure 1 depicts the locations of soil borings adjacent to the process sewer line.

The pipeline has a north-south orientation and intersects the entire Former Drum Storage Area on the east side of the RCRA Hazardous Waste Storage Building. A series of manholes are connected to the pipeline along its length. To the north, the pipeline exits the Former Drum Storage Area and continues in a northerly direction beneath the plant roadway. The supplemental sampling was conducted along the pipeline in approximately 20 foot intervals between the northeast corner of the hazardous waste storage building and the manhole (M.H. N^o 3) located approximately 100 feet away as shown in Figure 1.

2.1 Drilling and Soil Sample Collection

A truck-mounted geotechnical drilling rig (CME-75) capable of hollow-stem auguring techniques was used to obtain discrete soil samples at the designated soil boring locations. Sample collection commenced at 6 feet below ground surface (ft-bgs) near the base of the process sewer line. Soil samples were collected in two-foot increments with clean split-barrel samplers according to ASTM Method D1586 (Penetration Test and Split-Barrel Sampling of Soils) procedures. Continuous sampling was performed in each of the soil borings from the initial sampling depth to a minimum depth of 14 ft-bgs. Samples obtained from greater depths were collected at the discretion of the supervising DEI geologist based on field screening results.

The retrieved soil samples were visually inspected and logged by the supervising DEI geologist. The samples were field-classified according to the Unified Soil Classification System (USCS) with respect to soil type, color, grain size, texture, and moisture content. Evidence of staining and/or odors was also documented.

Hollow stem auger cuttings and discarded soil samples were collected and placed in labeled storage containers. The containers were sealed and staged onsite pending further characterization. Each completed soil boring was immediately sealed to ground surface with a bentonite/cement grout mix by tremie grouting methods.

2.2 Field Screening Procedures

After logging, a representative portion of each soil sample was retained for field screening of organic vapors by headspace analysis. The soil was placed into a clean 8-ounce sample jar and filled to one-half capacity. The sample jar was sealed with aluminum foil and then warmed to room temperature before screening. A photoionization detector (10.2 eV) was used to measure the headspace vapor concentration by inserting the instrument probe through the foil into the headspace volume. The maximum instrument reading was then recorded for each analyzed sample.

2.3 Sample Preparation

Soil sample collection proceeded at each boring location until a low level or nondetectable headspace result was achieved at or below the minimum proposed sample depth outlined in the SAP. Soil sample collection near location 53C proceeded in a similar manner. However, in this case, samples were collected for three consecutive sampling intervals of 18-20, 20-22, and 22-24 ft-bgs below the last detection point. A confirmatory soil sample was taken from the bottom of each boring and sent for laboratory analysis.

The confirmation samples were placed in clean laboratory-supplied sample jars and were secured with teflon-lined lids. The sample jars were labeled with the following information:

- Sample number, location, and depth interval (soil boring locations were designated as SB, i.e. SB-62 means soil boring at location 62).
- Date and time collected.
- Sampler's initials.
- Project number.
- Compounds for analysis.

The samples jars were stored in a cooler and chilled to below 4 degrees C for preservation and transport to the analytical laboratory. Chain-of-custody (COC) documentation followed standard

procedures with the original forms accompanying the samples to the laboratory. Copies are retained in DEI files and are included in Appendix B of this report.

2.4 Decontamination Procedures

The drilling rig, downhole tools, and sampling equipment were decontaminated to ensure the integrity of the soil sampling event. A temporary decontamination pad was erected adjacent to the assessment area. The downhole tools used to penetrate the subsurface were cleaned with a high pressure, hot water washer prior to drilling, in-between soil boring locations, and before demobilization from the site. The split-barrel samplers were manually washed after each use with a non-phosphate detergent wash, followed by a potable water rinse, and finally a deionized water rinse. The decontamination fluids were collected and transferred to onsite storage containers. The containers were labeled, sealed, and staged onsite pending further characterization.

3.0 INVESTIGATION RESULTS

The investigation results characterizing subsurface conditions adjacent to the process sewer line are summarized in this section including geologic conditions, field screening and laboratory results.

3.1 Site Geologic Conditions

The five soil borings collected adjacent to the process sewer line provided geologic information for the assessment area. The lithologic logs generated while drilling the soil borings were used for geologic interpretation. The soil boring logs are included in Appendix C of this report.

The soil borings were advanced to depths ranging from 14 feet in soil boring SB-62 to 24 feet in borings SB-53CR and SB-60. The lithologic logs reveal that the process sewer line is buried within an unconsolidated clayey silt to silty clay formation underlain by a gravely sand layer. This data concurs with the general understanding of site geologic conditions for the Dow Hanging Rock Plant.

The upper silty clay to clayey silt layer is typically described as soft, light brown to brown, and moist. This layer extended from directly beneath the asphalt surface to a maximum depth of 12 feet (SB-53CR, SB-60, and SB-61). Distinct gray mottling occurred within the uppermost 8 feet of this horizon. The base of the clayey silt to silty clay layer increased in elevation to the north from 12 ft-bgs in soil boring SB-53CR to 11.5 ft-bgs in SB-63 located adjacent to the manhole.

A well-defined contact separated the upper clayey silt to silty clay layer from the underlying gravely sand formation. The gravely sand was typically characterized as medium dense, well graded, light brown, and moist. Drilling was terminated before the base of this formation was encountered.

Saturated subsurface conditions were not observed during the assessment and the soil borings were completed entirely within the unsaturated zone.

3.2 Field Screening Results

A total of 31 soil samples were field screened for organic vapor headspace concentrations during this sampling program. Table 1 summarizes the headspace organic vapor data for each boring location

by depth, and Figure 2 illustrates these results along the north-south cross-section of the process sewer line area.

The data in Table 1 and Figure 2 reveal the following:

- The highest organic vapor headspace concentration (2559 ppm) was detected at a depth of 6-8 ft-bgs in soil boring SB-63, which was located east of M.H. N° 3. The second highest organic vapor headspace concentration (1004 ppm) was detected at a depth of 10-12 ft-bgs in soil boring SB-53CR, just north of the Old Drum Storage Area.
- Organic vapor headspace concentrations generally decreased with depth in soil borings SB-63 and SB-62.
- Organic vapor headspace concentrations increased to a depth of 10-12 ft-bgs in soil borings SB-61, SB-60, and SB-53CR. Beyond that, they showed a sharp decrease with depth.
- The high organic vapor headspace concentrations are predominantly confined to the clayey silt to silty clay layer overlaying the gravely sand formation, i.e. to a depth of 11-12 ft-bgs.
- The organic vapor headspace concentrations noticeably diminished beneath the contact of the two formations within the gravely sand.
- The organic vapor headspace concentrations were near or at the detection limit at depths of 20-24 ft-bgs for soil borings SB-63, SB-60, and SB-53CR. Soil borings SB-62 and SB-61 showed the same behavior at a shallower depth, i.e. 14-16 ft-bgs.
- Headspace of soil samples collected for three consecutive sampling intervals (18-20, 20-22, and 22-24 ft-bgs) resulted in non-detected organic vapors in SB-53C.

It should be emphasized that no saturated zone, nor groundwater were encountered in any soil boring at any depth interval. In particular, SB-53CR, the location which exhibited the highest constituent

concentrations in soil at the greatest depth sampled in the previous investigation, did not show any sign of groundwater to a depth of 24 ft-bgs (DEI, 1995b). This, together with the non-detected or low-detected organic vapors, eliminates the concern about constituents migration to the groundwater.

The field screening results indicate that the constituents released from the process sewer line are essentially retained within the silt and clay soils that surround the sewer line. The laboratory analytical data support this statement.

3.3 Laboratory Analysis

A total of five soil samples were submitted for analysis by U.S. EPA SW-846 Method 8240A (U.S. EPA, 1986) which included testing for acrylonitrile, ethylbenzene, methylene chloride, and styrene. The samples were also analyzed for barium by U.S. EPA SW-846 Method 6010A (U.S. EPA, 1986).

As previously described, one sample collected from the bottom of each soil boring was submitted for laboratory analysis. All soil sample results were reported with below Quantitation Limits concentrations for the volatile compound analyses, with the exception of acetone. Acetone was detected in three of the five samples. Acetone was not detected in the laboratory blank; however, this compound is a common laboratory contaminant. The analytical data were validated by DEI in accordance with the U.S. EPAs Region III Modifications to National Functional Guidelines for Organic Data Review (June 1992). The data validation letter and the results as reported by the laboratory are included in Appendix D. The data validation letter contains a table summarizing all analytical results and detection limits.

Barium was detected in each of the samples and ranged from 30.4 milligrams per kilogram (mg/kg) in soil boring SB-53CR to 63 mg/kg in soil boring SB-62. These results are at the low end of background barium concentrations (30-700 ppm) for soil for this region in Ohio (U.S. Dept. of Interior, 1971).

4.0 SUMMARY

The data shown in Figure 2 visually portrays the extent of constituents in soil. This figure shows the constituent concentrations in soil are confined primarily to the clayey silt to silty clay layer with a migration of small quantities into the gravely sand layer. The data show the vertical extent of constituents ranges from about 12 to 25 ft-bgs. Constituent concentrations to the north of the former drum storage area are associated with previous leaks from the process sewer line.

In addition, the soil borings did not detect any saturated zone or groundwater in any of the borings. This is also true for SB-53CR at a depth where three consecutive sampling intervals revealed non-detected organic vapors in headspace and that was confirmed with below quantitation limits for the laboratory soil sample. This eliminates the issue of constituent migration to groundwater and the need for installation of groundwater monitoring wells.

5.0 REFERENCES

AWD Technologies, Inc., 1993. Closure Plan Modification. Old Drum Storage Area. Hanging Rock Plant. Ironton, Ohio. Project Number 7015-500, September.

AWD Technologies, Inc., 1994. Closure Plan Modification. Old Drum Storage Area. Hanging Rock Plant. Ironton, Ohio. Draft Revisions. Project Number 7015-500, August 29.

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Ohio Environmental Protection Agency, 1993a. Letter re: Lawrence Co. Dow Chemical RCRA/LQG-TSD OHD039128912, 04-44-0022 to Ms. Katherine Anderson from Mr. Michael Moschell, Inspector - DHWM, May 4.

Ohio Environmental Protection Agency, 1993b. Letter re: Lawrence Co. Dow Chemical RCRA/LQG-TSD OHD039128912, 04-44-0022 to Ms. Katherine Anderson from Mr. Michael Moschell, Inspector - DHWM, August 25.

U.S. Department of Interior, 1971. Elemental Composition of Surficial Materials in the Conterminous United States, Hanford T. Shacklette, J. C. Hamilton, Josephine G. Boerngen, and Jessie M. Bowles.

U.S. Environmental Protection Agency, 1992. National Functional Guidelines for Organic Data Review. Prepared for the Hazardous Site Evaluation Division, U.S. EPA, June.

U.S. Environmental Protection Agency, 1986. Test Methods for Evaluating Solid Waste. Third Edition. Volume 1A: Laboratory Manual Physical/Chemical Methods, Office of Solid Waste and Emergency Response, Washington, D.C., November.

TABLES

<p style="text-align: center;">TABLE 1</p> <p style="text-align: center;">ORGANIC VAPOR HEADSPACE CONCENTRATIONS</p> <p style="text-align: center;">for the</p> <p style="text-align: center;">SOIL BORING SAMPLES ALONG THE</p> <p style="text-align: center;">PROCESS SEWER LINE AS A FUNCTION OF DEPTH</p>						
Depth (ft-hgs)	Organic Vapor Headspace Concentration (ppm) at the Indicated Soil Boring					
	SB-53CR	SB-60	SB-61	SB-62	SB-63	
6-8	85	175	78	34	2559	
8-10	226	494	102	36	439	
10-12	1004	532	741	ND	48	
12-14	7.3	290	ND	ND	7.3	
14-16	ND	NM	9.7		7.3	
16-18	34	NM			4.8	
18-20	ND	78			4.8	
20-22	ND	NM				
22-24	ND	7.3				

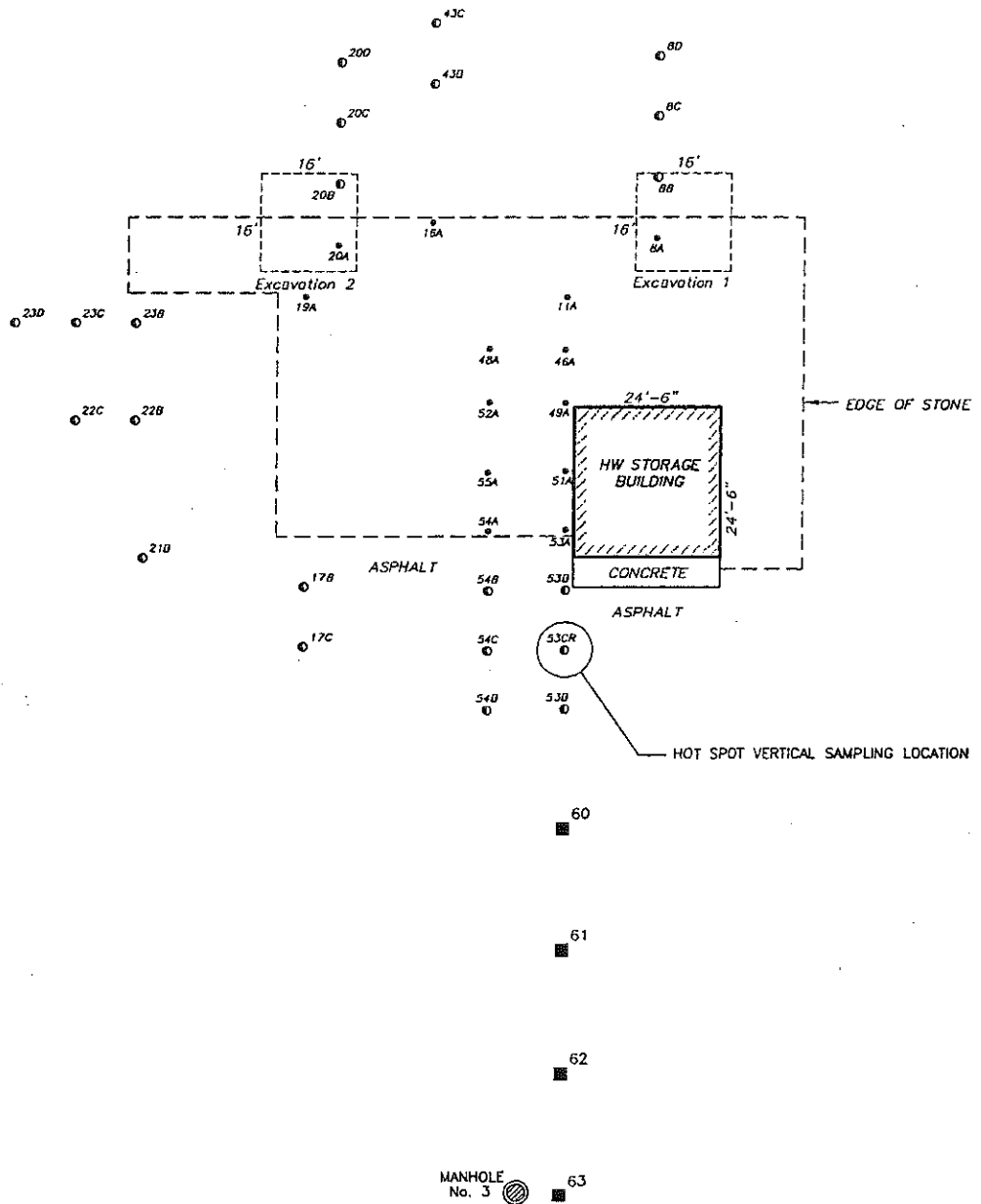
TABLE 2
SOIL VOLATILE ORGANIC COMPOUND (VOC) CONCENTRATIONS
FOR SAMPLES ALONG THE PROCESS SEWER LINE

	Volatile Organic Concentrations (µg/kg) at Indicated Soil Boring						
	SB-63		SB-62		SB-61		SB-53CR
CHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
ACETONE	23	15	15	10 U	10 U	10 U	22
CARBON DISULFIDE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
1,1-DICHLOROETHENE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
1,1-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHENE (total)	50 U	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROFORM	50 U	50 U	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-TRICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
CARBON TETRACHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
VINYL ACETATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
1,1,2,2-TETRACHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROPROPANE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
trans-1,3-DICHLOROPROPENE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
TRICHLOROETHENE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
DIBROMOCHLOROMETHANE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
1,1,2-TRICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
BENZENE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
cis-1,3-TRICHLOROPROPENE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2-CHLOROETHYL VINYL ETHER	200 U	200 U	200 U	200 U	200 U	200 U	200 U
BROMOFORM	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2-HEXANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
TOLUENE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROBENZENE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
ETHYLBENZENE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
STYRENE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
XYLENES (total)	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SAMPLING DEPTH	Sampled from 18-20 ft.	Sampled from 13-14 ft.	Sampled from 14-16 ft.	Sampled from 22-24 ft.	Sampled from 22-24 ft.	Sampled from 22-24 ft.	Sampled from 22-24 ft.

U = Nondetected, Number indicates detection limit

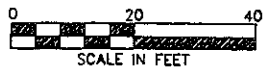
TABLE 3 CONCENTRATIONS OF BARIUM IN SOIL FOR SAMPLES ALONG THE PROCESS SEWER LINE				
Barium Concentrations (µg/kg) at Indicated Soil Boring				
BARIUM	SB-63 43.1	SB-62 63	SB-61 48.8	SB-60 37.9
SAMPLING DEPTH	Sampled from 18-20 ft.	Sampled from 13-14 ft.	Sampled from 14-16 ft.	Sampled from 22-24 ft.
				SB-63CR 30.4

FIGURES



LEGEND

- APPROXIMATE EXTENT OF DRUM STORAGE AREA
- PHASE III AND IV SAMPLE POINT
- PHASE IV SAMPLE POINT
- SUPPLEMENTAL PHASE IV SAMPLE POINT
- 53CR HOT SPOT SAMPLING POINT



REFERENCE

BASE MAP TAKEN FROM OHM CORPORATION'S FIGURE 2.3 OF PROJECT No. 12299.

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Dow Environmental

SUPPLEMENTAL PHASE IV SAMPLE LOCATIONS

HANGING ROCK CLOSURE

IRONTON, OH

CLIENT: THE DOW CHEMICAL COMPANY

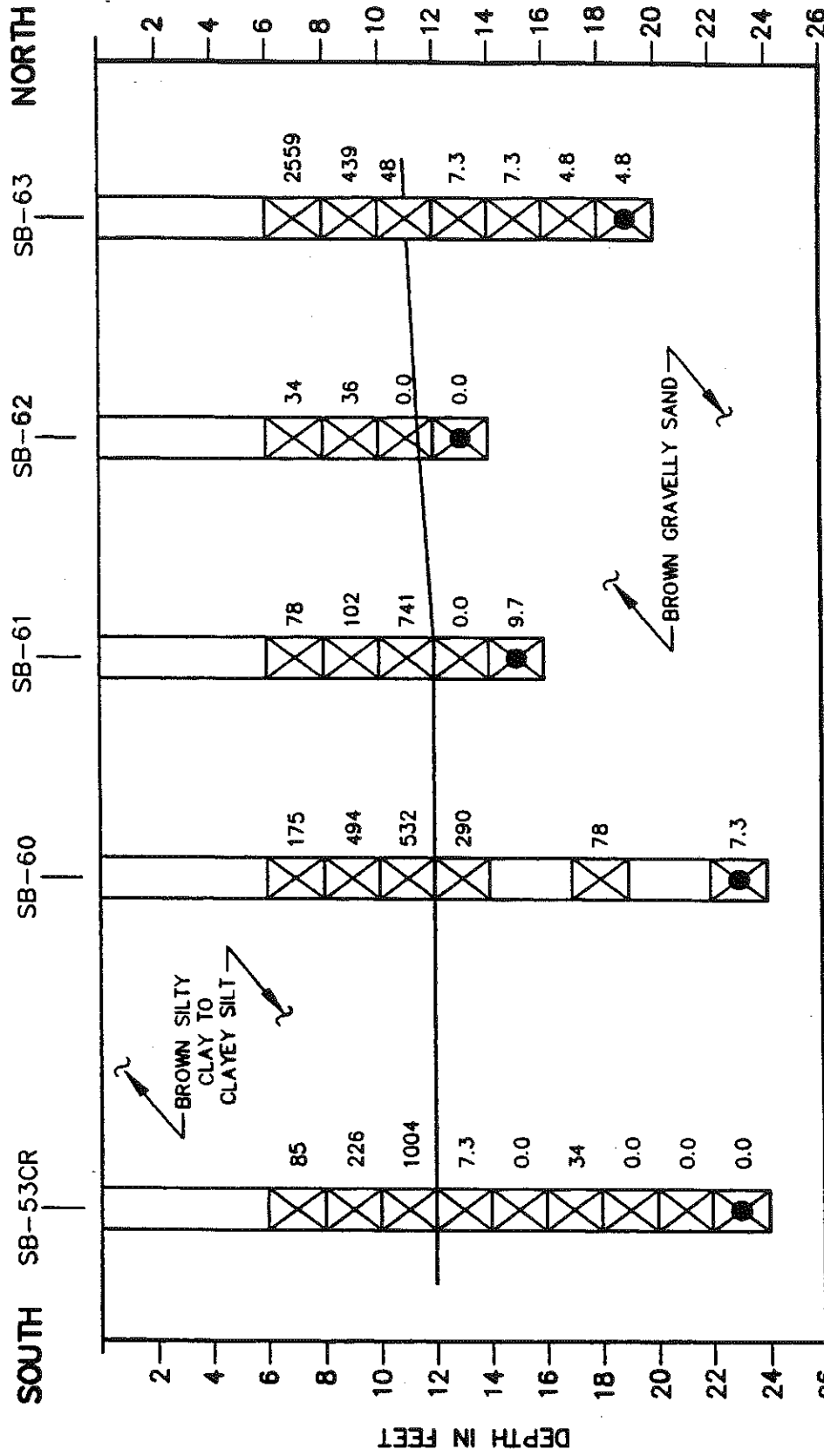
JOB NUMBER: 7015-500

SCALE: AS SHOWN

FIGURE
NUMBER

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LEGEND



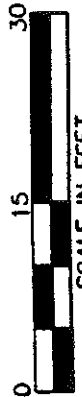
7.3 SAMPLE INTERVAL AND HEADSPACE
ORGANIC VAPOR RESULT (ppm)



LABORATORY ANALYTICAL SAMPLE
RESULT OF NON-DETECT

SB

SOIL BORING



SCALE IN FEET



Dow Environmental

0011223344556677889900
K K K K K K K K K K K K K K K K

ORGANIC SOIL VAPOR & LABORATORY ANALYTICAL RESULTS
FROM SOIL BORINGS ALONG THE PROCESS SEWER LINE
NORTH OF THE FORMER DRUM STORAGE AREA
HANGING ROCK CLOSURE
CLIENT: THE DOW CHEMICAL COMPANY IRONTON, OH
JOB NUMBER: 7015-500
SCALE: AS SHOWN
FIGURE NUMBER: 2
REV: 0

APPENDIX A

ADDENDUM TO SAMPLING AND ANALYSIS PLAN

**ADDENDUM TO SAMPLING AND ANALYSIS PLAN
ADDITIONAL SAMPLING**

FOR

OLD DRUM STORAGE AREA

**HANGING ROCK PLANT
IRONTON, OHIO**

**Prepared for:
THE DOW CHEMICAL COMPANY**

**Prepared by:
DEI ENVIRONMENTAL, INC.
PITTSBURGH, PENNSYLVANIA**

PROJECT NUMBER 7015-500

OCTOBER 1995

Introduction

This document is an addendum to the Sampling and Analysis Plan dated September 1994. This addendum describes soil, and if necessary groundwater, sampling that will aid in defining the horizontal and vertical extent of contamination adjacent to the sewer line north of the Old Drum Storage Area at The Dow Chemical Company, Hanging Rock Plant in Ironton, Ohio. Additionally, vertical delineation will be conducted at one location.

All soil samples collected during this phase of investigation will be continuous. Soil samples collected during this phase will be analyzed for acrylonitrile (AN), styrene (ST), methylene chloride (MC), ethyl benzene (EB), and barium (Ba).

Sampling Methods, Locations, and Number

Soil samples will be collected every 20 feet horizontally along the sewer line up to but not past the manhole located 100 feet north of the Old Drum Storage Area. This area has been identified on Figure 1. Samples will be collected from an interval starting at the base of the pipe 6 feet below the ground surface to a depth of 11 feet or until headspace readings indicate non-detection (ND), or until soil sample concentrations are below risk based criteria. In addition, samples will be collected along the sewer line where the video indicates possible leakage if sampling has not already been performed in accordance with the above referenced frequency.

Soil sampling to determine vertical delineation will be performed beneath the sewer line at hot spot 53-C defined during previous investigative activities. At this location, PID readings will be taken on headspace samples continuously until ND levels are reached or until sample concentrations are below risk based criteria. A soil sample will then be collected and sent for laboratory analysis. If soil samples headspace indicate contamination through the clay layer, sampling and associated PID headspace analyses will continue through the underlying sand and gravel layers. In this case, a soil profile will be developed and if possible, a ground water sample will be collected and analyzed. This sampling location is identified on Figure 1. Soil sampling will terminate upon encountering the watertable or after headspace readings indicate non-detection (ND) for three consecutive samples.

If high levels of constituents are found in the soils at the seasonal high water table, groundwater monitoring wells will be installed to monitor the groundwater quality and determine the groundwater's depth and direction of flow. If necessary, monitoring well installation will be in

accordance with Section 3.3 of the Phase IV Sampling Report and Management Plan dated February 1995.

Sampling will be conducted continuously in the test borings using a split spoon sampler. Standard penetration tests in accordance with ASTM Specification D1586 will be performed while obtaining each sample. All samples collected will be containerized for either field headspace analysis or laboratory analysis. The field headspace samples will be containerized in clean 8 ounce mason jars approximately $\frac{1}{2}$ full. The headspace samples will be allowed to equilibrate at room temperature for approximately 45 minutes prior to obtaining a reading.

Readings of contained volatile gases within the jars will be then measured using a photo ionization detector (PID) with a 10.2 electron volt lamp. The PID will be calibrated using isobutylene, a benzene equivalent substance. All headspace readings will be recorded and submitted in the final report.

All candidate laboratory samples collected will be containerized and kept at a temperature of approximately 4 degrees C until shipped to the analyzing laboratory. Chain of custody procedures and sample holding time guidelines will be followed throughout the sample acquisition, handling, and transporting process.

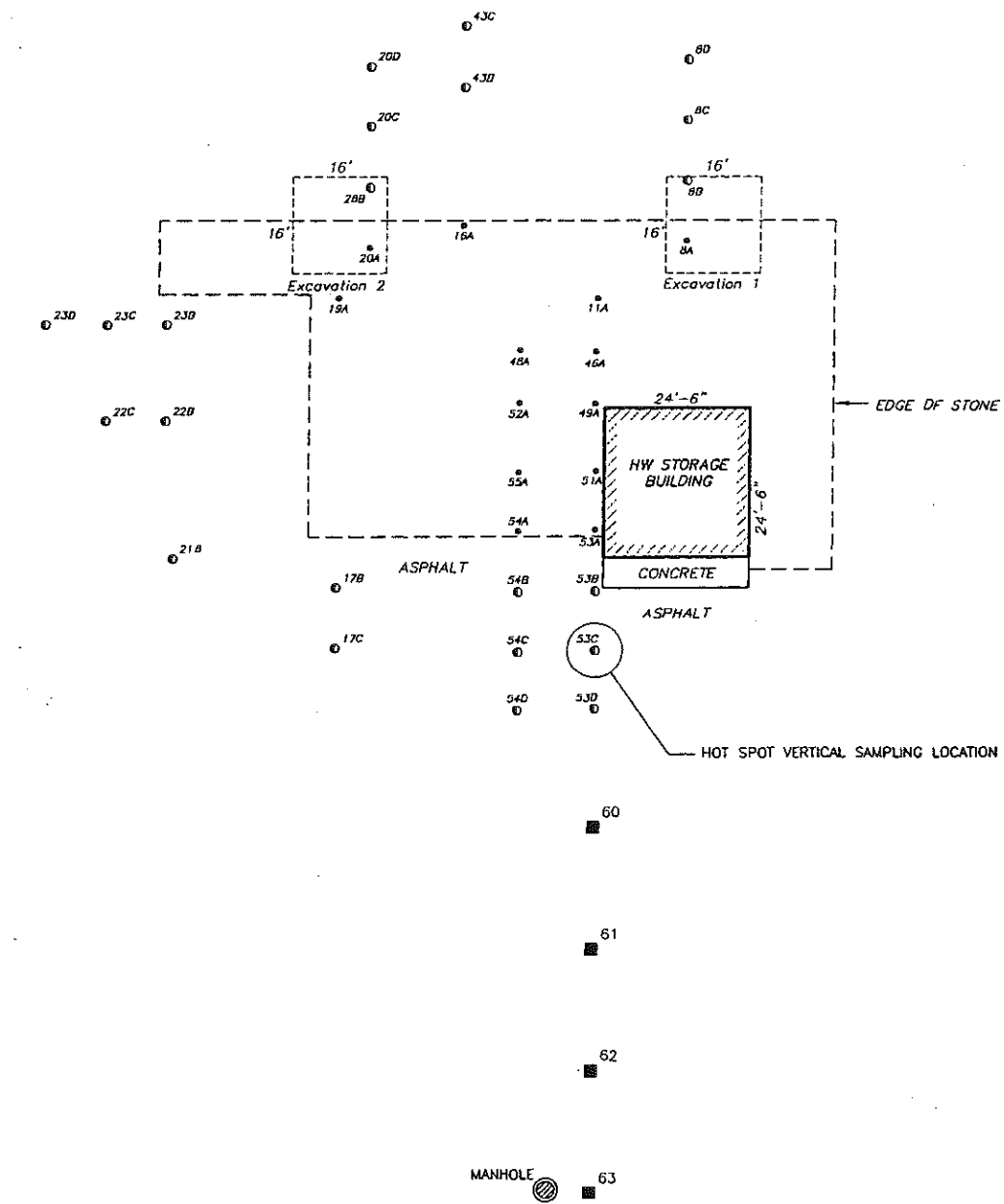
All borings will be logged in accordance with the Unified Soil Classification System (USCS) by the onsite hydrogeologist at the time of sample collection. The onsite hydro geologist will pay particular attention in defining moist or saturated zones as well as obvious contamination when constructing boring logs. All boring logs will be submitted as part of the final report.

Upon completion of drilling, each borehole will be sealed with a cement/bentonite grout. Wastes generated from investigation activities will be containerized onsite in sealed drums for future disposal pending waste characterization.

Sample identification, equipment decontamination, and analytical and QA/QC methods will be performed in accordance with procedures outlined in the Sampling and Analyses Plan for additional sampling dated September 1994.

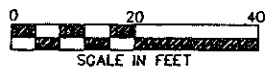
Field sampling activities will be scheduled to commence within 2 weeks, but no sooner than 5 working days, after verbal concurrence with this plan by OEPA. Field activities are anticipated

to be completed within 3 days of initiation. Laboratory results will be provided within 14 working days of receipt by the laboratory.



LEGEND

- APPROXIMATE EXTENT OF DRUM STORAGE AREA
- PHASE IV SAMPLE POINT
- PHASE III AND IV SAMPLE POINT
- PHASE IV SAMPLE POINT



REFERENCE

BASE MAP TAKEN FROM OHM CORPORATION'S FIGURE 2.3 OF PROJECT No. 12299.

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Dow Environmental

SUPPLEMENTAL PHASE IV SAMPLE LOCATIONS

HANGING ROCK CLOSURE

IRONTON, OH

CLIENT: THE DOW CHEMICAL COMPANY

JOB NUMBER: 7015-500

SCALE: AS SHOWN

FIGURE NUMBER

5

REV 1

APPENDIX B
CHAIN-OF-CUSTODY FORM

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

MARK LINTZ

Report to: New Environmental Inc.

Penn Center West, Bldg 3, Suite 320

Pittsburgh PA	5276
---------------	------

Telephone: 788-2717

Lab Contact

Purchase Order No.

Project Reference

Down Hanging Back

7015.500

But to:

Page — of

ONE CONTAINER PER LINE

Sample ID	Sample Type/Description	Date Collected	Time Collected	Container Type	Pre-servative	Required Tests	Condition on Receipt (Lab)
SB63-1820	S011	11/10/96	1445	Glass	-	Volatile Organics (8240) / Barium	490
SB62-1214	{	"	1645	{	-	per JS analysis by LALICKA, KOST 11/13/96	
SB61-1416		11/11/96	0955		-		
SB60-2224		11/11/96	1240		-		
SB53C-2224		11/11/96	1525		-		
Possible Hazard Identification:						Sample Disposal:	
Non-hazard		Flammable		Skin Irritant	Other	Return to Client	
Turnaround Time Required:		Normal 14 Days		Report Required By		Disposal by Lab	
1. Releiquished by		Date/Time		Date/Time		Archive	
Signature/Attestation		11/11/96 1630		11/11/96 - 1700		(mos)	
2. Releiquished by		Date/Time		Date/Time			
Signature/Attestation		11/13/96		11/13/96 1130			
Special Instructional Comments:							
AB # 6845548684							
(1) Coolers							

APPENDIX C
SOIL BORING LOGS

TEST BORING 12-00

PAGE OF 2

PROJECT NAME Dow Hanging Rock PlantPROJECT NO. 7015.500LOCATION Former Drum Storage AreaGEOLOGIST D. Martineau

DEPTH FEET	SOIL SAMPLE			VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	CWA READING	DEPTH (FEET)	REMARKS
	NO.	REC. (IN.)	BL. #						
0				HSA - ASPHALT					Headspace Results (ppm)
2				HSA Cuttings - Brown <u>SILT</u> . Some Clay, Moist	ML				
6	SS1	12	5 6 7 10	Stiff, Brown <u>SILT</u> and <u>CLAY</u> . Many Distinct Gray-Brown Mottles Moist No odor	ML CL				175
8	SS2	17	3 3 5 5	Soft to Medium Stiff, Brown <u>SILT</u> , Some Clay, Common Distinct Gray Mottles, Moist to Wet. Chemical Odor	ML				494
10	SS3	16	2 3 5 5	Soft to Medium Stiff, Brown to Brown- Gray <u>SILT</u> , Some Very Fine Sand, Trace Clay, Moist, Strong Chemical Odor	ML				532
12	SS4	17	10 18 18 20	Medium Dense, Brown, <u>Fine to Coarse</u> <u>SAND</u> , Some Fine Gravel, Moist, Chemical Odor	SW				Clear Contact
14	HSA			As Above	SW				290
16									

ADDITIONAL
REMARKS

Drilling Co. - Philip Environmental, Inc. Driller: Gary Sudduth
 • CM2-75 ; 4 1/4 HSA with Split Spoon Sampling
 • Drilled and Sampled on 11/11/96

TEST BORING SB-60

PAGE 2 OF 2

PROJECT NAME Dow Hanging Rock PlantPROJECT NO. 7015.528LOCATION Former Drum Storage AreaGEOLOGIST D. Martinek

DEPTH FEET	SOIL SAMPLE			VISUAL CLASSIFICATION AND REMARKS	PROFILE	STAKE NUMBER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
	NO.	REC. (IN.)	BL. 6						
16	HSA								
17	SS5	14	7 15 14 17	Medium Dense, Brown, Medium to Coarse SAND, Some Fine Gravel, Moist, Chemical Odor	SP				7.8
19	HSA			As Above	SP				
22	SS6	14	6 9 11 12	Medium Dense, Light Brown, Medium to Coarse SAND, Little to Some Fine Gravel, Moist	SP				Headspace 7.3 Analytical Sample: DHR-SB60-2224
24				LOG = 24.0'					

• Boring Backfilled with Bentonite / Cement Grout

ADDITIONAL
REMARKS

TEST BORING <u>22-21</u>										PAGE OF	
PROJECT NAME <u>Dow Haring Rock Plant</u>										PROJECT NO. <u>7015.500</u>	
LOCATION <u>Former Drum Storage Area</u>										GEOLOGIST <u>D. Martineck</u>	
DEPTH	SOIL SAMPLE			VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	CWA READING	DEPTH (FEET)	REMARKS		
FEET	NO.	REC. (IN.)	SL. #								
				HSA - ASPHALT					Headspace Result (ppm)		
2				HSA Cuttings - Light Brown <u>SILT</u> and <u>CLAY</u> , becoming a Silty Clay with Many Distinct Gray Mottles, Moist	ML CL						
4											
6											
	SS1	14	3 7 7 7	Medium Stiff, Light Brown <u>CLAY</u> , some Silt, Many Distinct Light Gray Mottles, Moist	CL				78		
8											
	SS2	14	2 5 6 6	Medium Stiff, Brown <u>SILT</u> , some clay, Common Distinct Light Gray Mottles, Moist, Chemical Odor	ML				102		
10											
	SS3	14	1 2 4 12	Soft, As Above, becoming Siltyier with Very Fine Sand, Moist, Slight Chemical Odor (12.0') Medium Dense Gray-Brown <u>Fine to Coarse SAND</u> , some silt, Trace Fine Gravel, Moist	ML				741		
12									Clear Contact		
	SS4	19	14 14 16 20	Medium Dense, Brown, Medium to Coarse <u>SAND</u> , some Fine Gravel, Moist	SP				0.0		
14											
	SS5	16	4 12 20 22	Medium Dense, Brown, <u>Fine to Coarse SAND</u> , some Gravel, Trace Silt, Moist	SW				Headspace 9.7 Analytical Sample DHR-5761-1416		
16				DOB = 16.0'							
ADDITIONAL REMARKS • Drilling Co. - Philip Environmental, Inc. Driller: Gary Swadlow • CME-75 ; 4 1/4 HSA with Split Spoon Sampling • Drilled and Sampled on 1/11/96 • Boring Backfilled with Bentonite / Cement Grout											

TEST BORING SB-62

PAGE 1 OF 1

PROJECT NAME Dow Hanging Rock PlantPROJECT NO. 7015-520LOCATION Former Drum Storage AreaGEOLOGIST J. Martinger

DEPTH FEET	SOIL SAMPLE			VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATS WATER LEVEL (FT)	OWA READING	DEPTH (FEET)	REMARKS
	NO.	REC. (IN.)	IN./ FT.						
				HSA - ASPHALT					Headspace Result (ppm)
2	HSA			HSA Cuttings - Light Brown <u>SILT</u> , Some Clay, Little Fine Sand and Fine Gravel, Moist	ML				
4	HSA								
6	SS1	19	6 8 10	Medium stiff to stiff, Light Brown <u>SILT and CLAY</u> , Many Distinct Light Gray Mottles, Moist, Slight Chemical Odor	ML / CL				34
8	SS2	18	3 4 5 6	Soft, As Above Becoming Siltier with Little Very Fine Sand, Moist, Slight Chemical Odor	ML / CL				36
10	SS3	18	1 4 14 20	Soft, Light Brown <u>SILT and CLAY</u> , Little Very Fine Sand, Moist <u>Clear Contact</u> Medium Dense, Light Brown, Fine to Coarse SAND, Little Fine Gravel, Moist	ML / CL SW				0.0
12	SS4	16	3 14 17 20	Medium Dense, Light Brown, Fine to <u>Coarse Sand</u> , Little Fine Gravel, Moist	SW				Headspace 0.0 Analytical Sample: DHR-SB.62-1214
14									
16				LOB = 14.0'					

ADDITIONAL
REMARKS

Drilling Co. - Philip Environmental, Inc. Driller - Garry Sudauch

- CME-75 - 4 1/4 HSA and Split Spoon Sampling
- Drilled and Sampled on 1/10/96
- Boring backfilled with Bentonite / Cement Grout

PROJECT NAME Dow Hanging Rock Plant

PROJECT NO. 7015-005

LOCATION Former Drum Storage Area

GEOLOGIST D. Martineau

DEPTH FEET	SOIL SAMPLE			VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC PRESSURE LEVEL (FT)	CWA READING	DEPTH (FEET)	REMARKS
	NO.	REC. (IN.)	BL/ G						
				HSA - ASPHALT					Headspace Result (ppm)
2	HSA			HSA Cuttings - Brown <u>SILT</u> , Little Clay, Trace Fine Gravel, Moist	ML				
4	HSA								
6									
	SS1	18	1 3 2 3	Soft, Light Brown <u>SILT</u> , Little Clay, Many Light Gray Mottles, Moist, Chemical Odor	ML				2559
8									
	SS2	17	1 2 4 4	Soft, Light Brown <u>SILT and Very Fine SAND</u> , Trace Clay, Moist	ML / SP				439
10									
	SS3	18	1 5 10 20	Soft, Light Brown <u>SILT and Very Fine SAND</u> , <u>Trace Clay</u> , <u>Moist to Wet</u> (11.0-12.0) Clear Contact, Light Brown Fine to Very Coarse <u>SAND</u> , Some Fine Gravel, Moist	ML / SP SW				48
12									
	SS4	16	6 14 16 16	Medium Dense, Light Brown, <u>Medium SAND</u> , Little Fine Gravel, Moist, Slight Chemical Odor	SP				7.3
14									
	SS5	19	5 13 18 19	Medium Dense, Light Brown, <u>Medium to Coarse SAND</u> , Little Fine Gravel, Moist, Slight Chemical Odor	SP				7.3
16									

ADDITIONAL
REMARKS

Drilling Co. - Philip Environmental, Inc. Driller: Gary Sudduth
 • CM2-75; 4 1/4 HSA and Split Spoon Sampling
 • Drilled and Sampled on 1/10/96

TEST BORING SB-03

PAGE 2 OF 2

PROJECT NAME Dow Hanging Rock PlantPROJECT NO. 7015.500LOCATION Former Drum Storage AreaGEOLOGIST D. Martineck

DEPTH FEET	SOIL SAMPLE			VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATS WATER LEVEL (FT)	CWA READING	DEPTH (FEET)	REMARKS
	NO.	REC. (IN.)	BL/ 6"						
16	SS6	18	10	Medium Dense, Light Brown, <u>Fine to Coarse SAND</u> , Some Fine Gravel Moist, Slight Chemical Odor	SW				
			13						4.8
			14						
			14						
18	SS7	16	4	Medium Dense, Light Brown, <u>Fine to Coarse SAND</u> , Some Fine Gravel, Moist	SW				Headspace - 4.8
			10						Analytical Sample:
			14						DHR-SB63-1820
			15						
20				20.0 = 20.0'					

ADDITIONAL
REMARKS

- Borehole backfilled with Bentonite / Cement Grout

TEST BORING SB-53CRPAGE OF 2PROJECT NAME Dow Hanging Rock PlantPROJECT NO. 7015.500LOCATION Former Drum Storage AreaGEOLOGIST D. Martineck

DEPTH FEET	SOIL SAMPLE			VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OJA READING	DEPTH (FEET)	REMARKS
	NO.	REC. (IN.)	BL. #						
0	HSA			ASPHALT CONCRETE					Headspace Results (ppm)
2				HSA Cuttings: Orange-Brown <u>SILT and CLAY</u> , Moist	ML CL				
6	SS1	18	3 4 5	Soft to Medium Stiff, Brown <u>SILT</u> , Some Clay, Common Distinct, Gray- Brown Mottles, Moist to Wet, Slight Chemical Odor	ML				85
8	SS2	15	2 3 4 4	Soft, Brown, <u>SILT</u> , Little Clay, Trace Very Fine to Fine Sand, Moist to Wet, Chemical Odor	ML				226
10	SS3	17	3 3 3 4	Soft, Brown <u>SILT and Fine SAND</u> , Trace Clay, Moist to Wet, Chemical Odor	ML SP				1004
12	SS4	16	7 4 18 22	Loose to Medium Dense, Brown, Fine to Coarse <u>SAND</u> , Some Fine Gravel, Moist, Slight Chemical Odor	SW				Clear Contact
14	SS5	15	7 10 14 22	Loose to Medium Dense, Brown, Medium to Coarse <u>SAND</u> , Some Fine Gravel, Moist, Chemical Odor	SP				7.3
16									0.0

ADDITIONAL
REMARKS

Drilling Co. - Philip Environmental, Inc. Driller: Garry Sudduth

- CME-75; 1/4 HSA with Split Spoon Sampling
- Drilled and Sampled on 1/11/96

TEST BORING SB-53CR

PAGE 2 OF 2

PROJECT NAME Dow Hanging Rock PlantPROJECT NO. 7215-S20LOCATION Former Drum Storage AreaGEOLOGIST D. Martin

DEPTH FEET	SOIL SAMPLE			VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	CVA READING	DEPTH (FEET)	REMARKS
	NO.	REC. (IN.)	BL. #						
16	SS6	10	10	Medium Dense, Brown, <u>Medium to Coarse SAND</u> , Some Fine Gravel, Moist	SP				
			17						34
			19						
			16						
18	SS7	18	10	Medium Dense, Light Brown, <u>Fine to Medium SAND</u> , Some Fine Gravel, Moist	SP				
			14						0.0
			18						
			18						
20	SS8	17	10	Medium Dense, Light Brown, <u>Fine to Very Coarse SAND</u> , Some Fine Gravel, Moist	SW				
			14						0.0
			16						
			18						
22	SS9	14	7	Medium Dense, Light Brown, <u>Fine to Very Coarse SAND</u> , Some Fine Gravel, Moist	SW				Headspace 0.0
			11						Analytical Sample:
			14						DTR-SB53CR-2'
			15						
24				LOG = 24.0'					

ADDITIONAL
REMARKS

• Boring backfilled with Bentonite / Cement Grout.

APPENDIX D

**DATA VALIDATION LETTER/RESULTS
AS REPORTED FROM LABORATORY**



Dow Environmental Inc.
Penn Center West
Building III, Suite 300
Pittsburgh, PA 15276
Fax: (412) 788-1316
(412) 788-2717

PGH-96-TMJ-138

DATE February 23, 1996

TO Dr. Amiram Roffman
Radian International LLC
Penn Center West
Pittsburgh, Pennsylvania 15276

FROM Thomas M. Jackman
Radian International LLC

SUBJECT Data Validation of:
Volatile Organic Compounds (VOCs)
Barium

RE: DOW Hanging Rock, Ohio Site

Ross Analytical Services, Inc. Work Order No.96-01-059

Sample IDs

DHR-SB63-1820	DHR-SB61-1416	DHR-SB53CR-2224
DHR-SB62-1214	DHR-SB60-2224	

Overview

This sample set for the soil borings along the process sewer line north of the Former Drum Storage Area contained 5 soil samples which were analyzed for Volatile Organic Compounds (VOCs) by U.S. EPA SW-846 Method 8240B and for barium by U.S. EPA Methods 3050A and 6010A.

Summary

All compounds were successfully analyzed in all samples. The quality of analytical data was evaluated by the following parameters: holding times, surrogate spike recoveries, laboratory control sample (LCS) results, and laboratory blanks. Areas of concern with respect to data usability are discussed below.

Data Validation Results

An examination of the analytical and quality control data in this data package indicates that quality assurance/quality control (QA/QC) criteria were met for all parameters.

Notes

The data were reviewed according to the National Functional Guidelines for Organic and Inorganic Data Review.

Information Regarding Report Content

Attachments:

1. Glossary of data qualifier codes.
2. Data Summary. This may include.
 - a) All positive results with qualifier codes, if applicable.
 - b) All estimated detection limits with qualifier codes, if applicable.
3. Appendix A - Results as Reported by the Laboratory

DATA SUMMARY
SOIL VOLATILE ORGANIC COMPOUND (VOC) CONCENTRATIONS
FOR SAMPLES ALONG THE PROCESS SEWER LINE

Sample ID	Volatile Organic Concentrations (µg/kg) at Indicated Soil Boring				
	DHR-SB63-1820	DHR-SB62-1214	DHR-SB61-1416	DHR-SB60-2224	DHR-SB53CR-2224
CHLOROMETHANE	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	50 U	50 U	50 U	50 U	50 U
ACETONE	23	15	10 U	10 U	22
CARBON DISULFIDE	50 U	50 U	50 U	50 U	50 U
1,1-DICHLOROETHENE	50 U	50 U	50 U	50 U	50 U
1,1-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHENE (total)	50 U	50 U	50 U	50 U	50 U
CHLOROFORM	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U
2-BUTANONE	10 U	10 U	10 U	10 U	10 U
1,1,1-TRICHLOROETHANE	50 U	50 U	50 U	50 U	50 U
CARBON TETRACHLORIDE	50 U	50 U	50 U	50 U	50 U
VINYL ACETATE	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	50 U	50 U	50 U	50 U	50 U
1,1,2,2-TETRACHLOROETHANE	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROPROPANE	50 U	50 U	50 U	50 U	50 U
trans-1,3-DICHLOROPROPENE	50 U	50 U	50 U	50 U	50 U
TRICHLOROETHENE	50 U	50 U	50 U	50 U	50 U
DIBROMOCHLOROMETHANE	50 U	50 U	50 U	50 U	50 U
1,1,2-TRICHLOROETHANE	50 U	50 U	50 U	50 U	50 U
BENZENE	50 U	50 U	50 U	50 U	50 U
cis-1,3-TRICHLOROPROPENE	50 U	50 U	50 U	50 U	50 U
2-CHLOROETHYL VINYL ETHER	200 U	200 U	200 U	200 U	200 U
BROMOFORM	50 U	50 U	50 U	50 U	50 U
2-HEXANONE	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	50 U	50 U	50 U	50 U	50 U
TOLUENE	50 U	50 U	50 U	50 U	50 U
CHLOROBENZENE	50 U	50 U	50 U	50 U	50 U
ETHYLBENZENE	50 U	50 U	50 U	50 U	50 U
STYRENE	50 U	50 U	50 U	50 U	50 U
XYLENES (total)	50 U	50 U	50 U	50 U	50 U

DATA SUMMARY

CONCENTRATIONS OF BARIUM IN SOIL. FOR SAMPLES ALONG THE PROCESS SEWER LINE

Barium Concentrations (µg/kg) at Indicated Soil Boring

Sample ID	DHR-SB63-1820	DHR-SB62-1214	DHR-SB61-1416	DHR-SB60-2224	DHR-SB63CR-2224
BARIUM	43.1	63	48.8	37.9	30.4

RESULTS AS REPORTED BY THE LABORATORY

Work Order # 96-01-059

Roso Analytical Services, Inc

Reported: 01/24/96

Sample Description Soil DNE-SB53CE-2224

Lab No. 05

Test Description Volatiles by GC/MS

Test Code 8240

DATE ANALYZED 01/17/96 DILUTION FACTOR 1 UNITS ug/Kg

CAS NO.	COMPOUND	RESULT	EQL	CAS NO.	PARAMETER	RESULT	EQL
74-87-3	Chloromethane	<EQL	10	78-87-5	1,2-Dichloropropane	<EQL	5.0
74-83-9	Bromomethane	<EQL	10	10061-02-6	trans-1,3-Dichloropropene	<EQL	5.0
75-01-4	Vinyl chloride	<EQL	10	79-01-6	Trichloroethene	<EQL	5.0
75-00-3	Chloroethane	<EQL	10	124-48-1	Dibromochloromethane	<EQL	5.0
75-09-2	Methylene chloride	<EQL	5.0	79-00-5	1,1,2-Trichloroethane	<EQL	5.0
67-64-1	Acetone	22	10	71-43-2	Benzene	<EQL	5.0
75-15-0	Carbon disulfide	<EQL	5.0	10061-01-5	cis-1,3-Dichloropropene	<EQL	5.0
75-35-4	1,1-Dichloroethene	<EQL	5.0	110-75-8	2-Chloroethyl vinyl ether	<EQL	200
75-34-3	1,1-Dichloroethane	<EQL	5.0	75-25-2	Bromoform	<EQL	5.0
156-60-5	1,2-Dichloroethene (total)	<EQL	5.0	591-78-6	2-Hexanene	<EQL	10
67-66-3	Chloroform	<EQL	5.0	108-10-1	4-Methyl-2-pentanone	<EQL	10
107-06-2	1,2-Dichloroethane	<EQL	5.0	127-18-4	Tetrachloroethene	<EQL	5.0
78-93-3	2-Butanone	<EQL	10	108-88-3	Toluene	<EQL	5.0
71-55-6	1,1,1-Trichloroethane	<EQL	5.0	108-90-7	Chlorobenzene	<EQL	5.0
56-23-5	Carbon tetrachloride	<EQL	5.0	100-41-4	Ethyl benzene	<EQL	5.0
108-05-4	Vinyl acetate	<EQL	10	100-42-5	Styrene	<EQL	5.0
75-27-4	Bromodichloromethane	<EQL	5.0		Xylenes	<EQL	5.0
79-34-5	1,1,2,2-Tetrachloroethane	<EQL	5.0				

SURROGATE	% RECOVERY	LIMITS	
1,2-Dichloroethane-d4	103	70	121
Toluene-d8	107	81	117
4-Bromofluorobenzene	97	74	121

Work Order # 96-01-059

Ross Analytical Services, Inc

Reported: 01/24/96

Sample Description Soil DMR-SB60-2224

Lab No. 04

Test Description Volatiles by GC/MS

Test Code 8240

DATE ANALYZED 01/17/96 DILUTION FACTOR 1 UNITS ug/Kg

CAS NO.	COMPOUND	RESULT	EQL	CAS NO.	PARAMETER	RESULT	EQL
74-87-3	Chloromethane	<EQL	10	78-87-5	1,2-Dichloropropane	<EQL	5.0
74-83-9	Bromomethane	<EQL	10	10061-02-6	trans-1,3-Dichloropropene	<EQL	5.0
75-01-4	Vinyl chloride	<EQL	10	79-01-6	Trichloroethene	<EQL	5.0
75-00-3	Chloroethane	<EQL	10	124-48-1	Dibromochloromethane	<EQL	5.0
75-09-2	Methylene chloride	<EQL	5.0	79-00-5	1,1,2-Trichloroethane	<EQL	5.0
67-64-1	Acetone	<EQL	10	71-43-2	Benzene	<EQL	5.0
75-15-0	Carbon disulfide	<EQL	5.0	10061-01-5	cis-1,3-Dichloropropene	<EQL	5.0
75-35-4	1,1-Dichloroethene	<EQL	5.0	110-75-8	2-Chloroethyl vinyl ether	<EQL	20.0
75-34-3	1,1-Dichloroethane	<EQL	5.0	75-25-2	Bromoform	<EQL	5.0
156-60-5	1,2-Dichloroethene (total)	<EQL	5.0	591-78-6	2-Hexanone	<EQL	10
67-66-3	Chloroform	<EQL	5.0	108-10-1	4-Methyl-2-pentanone	<EQL	10
107-06-2	1,2-Dichloroethane	<EQL	5.0	127-18-4	Tetrachloroethene	<EQL	5.0
78-93-3	2-Butanone	<EQL	10	188-88-3	Toluene	<EQL	5.0
71-55-6	1,1,1-Trichloroethane	<EQL	5.0	108-90-7	Chlorobenzene	<EQL	5.0
56-23-5	Carbon tetrachloride	<EQL	5.0	100-41-4	Ethyl benzene	<EQL	5.0
108-05-4	Vinyl acetate	<EQL	10	100-42-5	Styrene	<EQL	5.0
75-27-4	Bromodichloromethane	<EQL	5.0		Xylenes	<EQL	5.0
79-34-5	1,1,2,2-Tetrachloroethane	<EQL	5.0				

SURROGATE	% RECOVERY	LIMITS	
1,2-Dichloroethane-d4	105	70	121
Toluene-d8	103	81	117
4-Bromofluorobenzene	103	74	121

Work Order # 96-01-059

Ross Analytical Services, Inc

Reported: 01/24/96

Sample Description Soil DMR-SB61-1416

Lab No. 03

Test Description Volatiles by GC/MS

Test Code 8240

DATE ANALYZED 01/17/96 DILUTION FACTOR 1 UNITS ug/Kg

CAS NO.	COMPOUND	RESULT	EQL	CAS NO.	PARAMETER	RESULT	EQL
74-87-3	Chloromethane	<EQL	10	78-87-5	1,2-Dichloropropane	<EQL	5.0
74-83-9	Bromomethane	<EQL	10	10061-02-6	trans-1,3-Dichloropropene	<EQL	5.0
75-01-4	Vinyl chloride	<EQL	10	79-01-6	Trichloroethene	<EQL	5.0
75-00-3	Chloroethane	<EQL	10	124-48-1	Dibromochloromethane	<EQL	5.0
75-89-2	Methylene chloride	<EQL	5.0	79-00-5	1,1,2-Trichloroethane	<EQL	5.0
67-64-1	Acetone	<EQL	10	71-43-2	Benzene	<EQL	5.0
75-15-0	Carbon disulfide	<EQL	5.0	10061-01-5	cis-1,3-Dichloropropene	<EQL	5.0
75-35-4	1,1-Dichloroethene	<EQL	5.0	110-75-8	2-Chloroethyl vinyl ether	<EQL	200
75-34-3	1,1-Dichloroethane	<EQL	5.8	75-25-2	Bromoform	<EQL	1
156-60-5	1,2-Dichloroethene (total)	<EQL	5.0	591-78-6	2-Hexanone	<EQL	10
67-66-3	Chloroform	<EQL	5.0	108-10-1	4-Methyl-2-pentanone	<EQL	10
107-06-2	1,2-Dichloroethane	<EQL	5.0	127-18-4	Tetrachloroethene	<EQL	5.0
78-93-3	2-Butanone	<EQL	18	108-88-3	Toluene	<EQL	5.0
71-55-6	1,1,1-Trichloroethane	<EQL	5.8	108-98-7	Chlorobenzene	<EQL	5.0
56-23-5	Carbon tetrachloride	<EQL	5.0	108-41-4	Ethyl benzene	<EQL	5.0
108-05-4	Vinyl acetate	<EQL	10	108-42-5	Styrene	<EQL	5.0
75-27-4	Bromodichloromethane	<EQL	5.0		Xylenes	<EQL	5.0
79-34-5	1,1,2,2-Tetrachloroethane	<EQL	5.0				

SURROGATE % RECOVERY LIMITS

1,2-Dichloroethane-d4	105	70 - 121
Toluene-d8	107	81 - 117
4-Bromofluorebenzene	106	74 - 121

Sample Description Soil DMR-S262-1216

Lab No. 02

Test Description Volatiles by GC/MS

Test Code 8240

DATE ANALYZED 01/16/96 DILUTION FACTOR 1 UNITS ug/Kg

CAS NO.	COMPOUND	RESULT	EQL	CAS NO.	PARAMETER	RESULT	EQL
74-87-3	Chloromethane	<EQL	10	78-87-5	1,2-Dichloropropane	<EQL	5.0
74-83-9	Bromomethane	<EQL	10	10061-02-6	trans-1,3-Dichloropropene	<EQL	5.0
75-01-4	Vinyl chloride	<EQL	10	79-01-6	Trichloroethene	<EQL	5.0
75-00-3	Chloroethane	<EQL	10	124-48-1	Dibromochloromethane	<EQL	5.0
75-09-2	Methylene chloride	<EQL	5.0	79-00-5	1,1,2-Trichloroethane	<EQL	5.0
67-64-1	Acetone	15	10	71-43-2	Benzene	<EQL	5.0
75-15-0	Carbon disulfide	<EQL	5.0	10061-01-5	cis-1,3-Dichloropropene	<EQL	5.0
75-35-4	1,1-Dichloroethene	<EQL	5.0	110-75-8	2-Chloroethyl vinyl ether	<EQL	200
75-34-3	1,1-Dichloroethane	<EQL	5.0	75-25-2	Bromoform	<EQL	0
156-60-5	1,2-Dichloroethene (total)	<EQL	5.0	591-78-6	2-Hexanone	<EQL	10
67-66-3	Chloroform	<EQL	5.0	108-10-1	4-Methyl-2-pentanone	<EQL	10
107-06-2	1,2-Dichloroethane	<EQL	5.0	127-18-4	Tetrachloroethane	<EQL	5.0
78-93-3	2-Butanone	<EQL	10	108-88-3	Toluene	<EQL	5.0
71-55-6	1,1,1-Trichloroethane	<EQL	5.0	108-90-7	Chlorobenzene	<EQL	5.0
56-23-5	Carbon tetrachloride	<EQL	5.0	100-41-4	Ethyl benzene	<EQL	5.0
108-05-4	Vinyl acetate	<EQL	10	108-42-5	Styrene	<EQL	5.0
75-27-4	Bromodichloromethane	<EQL	5.0		Xylenes	<EQL	5.0
79-34-5	1,1,2,2-Tetrachloroethane	<EQL	5.0				

SURROGATE	% RECOVERY	LIMITS
1,2-Dichloroethane-d4	105	70 - 121
Toluene-d8	107	81 - 117
4-Bromofluorobenzene	99	74 - 121

Work Order # 96-01-059

Ross Analytical Services, Inc

Reported: 01/24/96

Sample Description Soil DMR-SB63-1820

Lab No. 01

Test Description Volatiles by GC/MS

Test Code 8240

DATE ANALYZED 01/16/96 DILUTION FACTOR 1 UNITS ug/Kg

CAS NO.	COMPOUND	RESULT	EQL	CAS NO.	PARAMETER	RESULT	EQL
74-87-3	Chloromethane	<EQL	10	78-87-5	1,2-Dichloropropane	<EQL	5.0
74-83-9	Bromomethane	<EQL	10	10061-02-6	trans-1,3-Dichloropropene	<EQL	5.0
75-01-4	Vinyl chloride	<EQL	10	79-01-6	Trichloroethene	<EQL	5.0
75-00-3	Chloroethane	<EQL	10	124-48-1	Dibromochloromethane	<EQL	5.0
75-09-2	Methylene chloride	<EQL	5.0	79-00-5	1,1,2-Trichloroethane	<EQL	5.0
67-64-1	Acetone	23	10	71-43-2	Benzene	<EQL	5.0
75-15-0	Carbon disulfide	<EQL	5.0	10061-01-5	cis-1,3-Dichloropropene	<EQL	5.0
75-35-4	1,1-Dichloroethane	<EQL	5.0	110-75-8	2-Chloroethyl vinyl ether	<EQL	20
75-34-3	1,1-Dichloroethane	<EQL	5.0	75-25-2	Bromoform	<EQL	
156-60-5	1,2-Dichloroethane (total)	<EQL	5.0	591-78-6	2-Hexanone	<EQL	1
67-66-3	Chloroform	<EQL	5.0	108-10-1	4-Methyl-2-pentanone	<EQL	1
107-06-2	1,2-Dichloroethane	<EQL	5.0	127-18-4	Tetrachloroethene	<EQL	5
78-93-3	2-Butanone	<EQL	10	108-88-3	Toluene	<EQL	5
71-55-6	1,1,1-Trichloroethane	<EQL	5.0	108-90-7	Chlorobenzene	<EQL	5
56-23-5	Carbon tetrachloride	<EQL	5.0	100-41-4	Ethyl benzene	<EQL	5
108-05-4	Vinyl acetate	<EQL	10	100-42-5	Styrene	<EQL	5
75-27-4	Bromodichloromethane	<EQL	5.0		Xylenes	<EQL	5
79-34-5	1,1,2,2-Tetrachloroethane	<EQL	5.0				

SURROGATE	% RECOVERY	LIMITS
1,2-Dichloroethane-d4	105	70 - 121
Toluene-d8	106	81 - 117
4-Bromofluorobenzene	100	74 - 121

Work Order # 96-01-059

Ross Analytical Services, Inc

Reported: 01/24/96

Barium by ICP

Method(s): 6010A

<u>Lab No.</u>	<u>Sample Description</u>	<u>Result</u>	<u>Units</u>	<u>EOL</u>
01A	Soil DHR-SB63-1820	43.1	mg/Kg	0.40
02A	Soil DHR-SB62-1214	63	mg/Kg	0.40
03A	Soil DHR-SB61-1416	48.8	mg/Kg	0.40
04A	Soil DHR-SB60-2224	37.9	mg/Kg	0.40
05A	Soil DHR-SB53CR-2224	30.4	mg/Kg	0.40

APPENDIX D

METHODOLOGY FOR CALCULATING THE RISK-BASED SOIL CLEAN-UP LEVELS

METHODOLOGY FOR DEVELOPING CLEANUP LEVELS

Risk-based soil cleanup levels for the closure of the Former Drum Storage Area at the DOW Chemical Hanging Rock Plant were developed using Ohio EPA Closure Plan Review Guidance for RCRA Facilities, Interim Final, September 1, 1993 and U.S. EPA Risk Assessment for Superfund, Part B (RAGS-B), December, 1991.

Soil cleanup levels were developed for industrial and residential (child and adult) land use by accounting for the cumulative effect of soil ingestion, dermal contact with soils, inhalation of vapors emitted from soil and inhalation of particulates for carcinogenic and noncarcinogenic effects. The following describes the methodology of the cleanup level calculations.

Ingestion and Dermal Contact

The equations and default factors used to evaluate carcinogenic and noncarcinogenic effects for residential and industrial exposures were obtained from Ohio EPA Closure Plan Review Guidance for RCRA Facilities. The equations and exposure factors for these scenarios are included in Attachment B. As specified by the Ohio EPA, oral Reference Doses (RfDo) and oral carcinogenic slope factors (CSFo) were adjusted when evaluating risks from dermal contact. The adjustment factors are as follows:

Methylene Chloride - 0.80
Acrylonitrile - 0.95
Ethylbenzene - 0.82
Styrene - 0.90

The result of this adjustment is that risks from dermal contact were increased (and cleanup levels lowered) by these factors relative to the oral RfDos and CSFos.

Inhalation Exposures

For inhalation scenarios, the exposure factors employed in the risk assessment equations were those supplied in Ohio EPA Closure Plan Review Guidance for RCRA Facilities. However, it was necessary to account for the chemical concentration in air term (CA) by using the guidance in RAGS-B, pages 27 and 28 (see Attachment C). This approach makes use of Volatilization Factors (VFs) and Particulate Emission Factors (PEFs) as means of estimating the amount of vapor or particulates in a given volume of air. For this assessment, the PEF value was the default value supplied in RAGS-B, $4.63 \times 10^9 \text{ m}^3/\text{kg}$. VFs were calculated for each constituent (see Attachment D). The values of all variables used to calculate the VFs were those specified in RAGS-B with the exception of the area of contamination. The site-specific area of contamination is $5,000,000 \text{ cm}^2$. Chemical specific variables such as the diffusion coefficient in air, Henry's Law Constant and Koc were obtained from the literature.

ATTACHMENTS

- ATTACHMENT A - RISK BASED SOIL CLEANUP LEVELS
FORMER DRUM STORAGE AREA
DOW HANGING ROCK PLANT**
- ATTACHMENT B - EXCERPTS FROM OHIO EPA CLOSURE PLAN REVIEW
GUIDANCE FOR RCRA FACILITIES**
- ATTACHMENT C - EXCERPTS FROM U.S. EPA RISK ASSESSMENT
GUIDANCE FOR SUPERFUND - PART B (RAGS-B)**
- ATTACHMENT D - CALCULATION OF VOLATILIZATION FACTORS (VFS)**

ATTACHMENT A

RISK BASED SOIL CLEANUP LEVELS

**FORMER DRUM STORAGE AREA
DOW HANGING ROCK PLANT**

**RISK-BASED SOIL CLEANUP LEVELS
FORMER DRUM STORAGE AREA
DOW - HANGING ROCK PLANT**

Constituent	Industrial Cleanup Level (mg/kg)	Residential Cleanup Level (mg/kg)
Acrylonitrile	2.5	1.0
Ethylbenzene	400*	400*
Methylene Chloride	50	20
Styrene	1,200*	450

* Soil Saturation Levels. As per U.S. EPA Soil Screening guidelines, (EPA /540/R-95/128, May 1996), soil saturation concentrations are used when risk-based cleanup levels are greater than the published soil saturation levels.

DOW HANGING ROCK PLANT, FORMER DRUM STORAGE AREA - FUTURE POTENTIAL RESIDENTIAL EXPOSURE
CARCINOGENIC AND NONCARCINOGENIC HEALTH EFFECTS FROM INGESTION OF SOILS - CHILD EXPOSURE

SOIL CONC.	INGESTION RATE	CONVERSION FACTOR	FRACTION INGESTED	EXPOSURE FREQUENCY	EXPOSURE DURATION	BODY WEIGHT	AVERAGING TIME (NC)	AVERAGING TIME (CA)	NONCARC. DOSE	CANCER DOSE	REFERENCE DOSE (RfD)	CARC. SLOPE FACTOR (CSF)	HAZARD QUOTIENT	CANCER RISK
(mg/kg)	(mg/soil/day)	(kg/mg)	(1=100%)	(events/yr)	(yr)	(kg)	(days)	(days)	(mg/kg/day)	(mg/kg/day)	(mg/kg/day)	(mg/kg/day)-1		
Methylene Chloride	20	1E-06	1.0	350	6	15	2,190	25,550	2.6E-04	2.2E-05	6.0E-02	7.5E-03	14.26E-03	1.64E-07
Acrylonitrile	1	1E-06	1.0	350	6	15	2,190	25,550	1.3E-05	1.1E-06	1.0E-03	5.4E-01	1.28E-02	5.92E-07
Ethylbenzene	400	1E-06	1.0	350	6	15	2,190	25,550	5.1E-03	4.4E-04	1.0E-01		5.11E-02	
Styrene	450	1E-06	1.0	350	6	15	2,190	25,550	5.8E-03	4.9E-04	2.0E-01		2.88E-02	
													9.70E-02	7.56E-07

DOW HANGING ROCK PLANT, FORMER DRUM STORAGE AREA - FUTURE POTENTIAL RESIDENTIAL EXPOSURE
CARCINOGENIC AND NONCARCINOGENIC HEALTH EFFECTS FROM INGESTION OF SOILS - ADULT EXPOSURE

SOIL CONC.	INGESTION RATE	CONVERSION FACTOR	FRACTION INGESTED	EXPOSURE FREQUENCY	EXPOSURE DURATION	BODY WEIGHT	AVERAGING TIME (NC)	AVERAGING TIME (CA)	NONCARC. DOSE	CANCER DOSE	REFERENCE DOSE (RfD)	CARC. SLOPE FACTOR (CSF)	HAZARD QUOTIENT	CANCER RISK
(mg/kg)	(mg/soil/day)	(kg/mg)	(1=100%)	(events/yr)	(yr)	(kg)	(days)	(days)	(mg/kg/day)	(mg/kg/day)	(mg/kg/day)	(mg/kg/day)-1		
Methylene Chloride	20	1E-06	1.0	350	30	70	10,950	25,550	2.7E-05	1.2E-05	6.0E-02	7.5E-03	4.57E-04	8.81E-08
Acrylonitrile	1	1E-06	1.0	350	30	70	10,950	25,550	1.4E-06	5.9E-07	1.0E-03	5.4E-01	1.37E-03	3.17E-07
Ethylbenzene	400	1E-06	1.0	350	30	70	10,950	25,550	5.5E-04	2.3E-04	1.0E-01		5.48E-03	
Styrene	450	1E-06	1.0	350	30	70	10,950	25,550	6.2E-04	2.6E-04	2.0E-01		3.08E-03	
													1.04E-02	4.05E-07

DOW HANGING ROCK PLANT, FORMER DRUM STORAGE AREA - COMMERCIAL/INDUSTRIAL EXPOSURE
CARCINOGENIC AND NONCARCINOGENIC HEALTH EFFECTS FROM INGESTION OF SOILS

SOIL CONC.	INGESTION RATE (mg/kg)	CONVERSION FACTOR (mg/kg/day)	FRACTION INGESTED (1-100%)	EXPOSURE FREQUENCY (event/yr)	EXPOSURE DURATION (yr)	BODY WEIGHT (kg)	AVERAGING TIME (NC) (days)	AVERAGING TIME (CA) (days)	NONCARC. DOSE (mg/kg/day)	CANCER DOSE (mg/kg/day)	REFERENCE DOSE (RfD) (mg/kg/day)	CARC. SLOPE FACTOR (CSF)	HAZARD QUOTIENT	CANCER RISK
Methylene Chloride	50	1E-06	1.0	250	25	70	9,125	25,550	2.4E-05	8.7E-06	6.0E-02	7.5E-03	4.08E-04	6.55E-08
Acrylonitrile	2.5	1E-06	1.0	250	25	70	9,125	25,550	1.2E-06	4.4E-07	1.0E-03	5.4E-01	1.22E-03	2.36E-07
Ethylbenzene	400	1E-06	1.0	250	25	70	9,125	25,550	2.0E-04	7.0E-05	1.0E-01		1.96E-03	
Styrene	1200	1E-06	1.0	250	25	70	9,125	25,550	5.9E-04	2.1E-04	2.0E-01		2.94E-03	
													6.52E-03	3.01E-07

**DOW HANGING ROCK PLANT, FORMER DRUM STORAGE AREA - FUTURE POTENTIAL RESIDENTIAL EXPOSURE
CARCINOGENIC AND NONCARCINOGENIC HEALTH EFFECTS FROM DERMAL CONTACT WITH SOILS - CHILD EXPOSURE**

CS	CF	SA	AF	ABS	EF	ED	BW	AT	AT	AVERAGING TIME (NC)	AVERAGING TIME (CA)	NONCARC. DOSE	CANCER DOSE	Dermal REFERENCE DOSE (RfD)	Oral CARC. SLOPE FACTOR (CSF)	HAZARD QUOTIENT	CANCER RISK
SOIL CONC.	CONVERSION FACTOR	SKIN SURFACE AREA (cm ² /event)	SKIN ADHERENCE FACTOR (mg/cm ²)	ABSORPTION FACTOR (1=100%)	EXPOSURE FREQUENCY (events/yr)	EXPOSURE DURATION (yr)	BODY WEIGHT (kg)	(days)	(days)	(days)	(days)	(mg/kg/day)	(mg/kg/day)	(mg/kg/day)	(mg/kg/day)		
Methylene Chloride	20	1E-06	2,000	1.0	0.25	350	15	2,190	25,550	25,550	25,550	6.4E-04	5.48E-05	6.0E-02	7.5E-03	1.33E-02	5.14E-07
Acrylonitrile	1	1E-06	2,000	1.0	0.25	350	15	2,190	25,550	25,550	25,550	3.2E-05	2.74E-06	1.0E-03	5.4E-01	3.36E-02	1.56E-06
Ethylbenzene	400	1E-06	2,000	1.0	0.25	350	15	2,190	25,550	25,550	25,550	1.3E-02	1.10E-03	1.0E-01	1.56E-01		
Styrene	450	1E-06	2,000	1.0	0.25	350	15	2,190	25,550	25,550	25,550	1.4E-02	1.23E-03	2.0E-01	7.99E-02		
																2.83E-01	2.07E-06

**DOW HANGING ROCK PLANT, FORMER DRUM STORAGE AREA - FUTURE POTENTIAL RESIDENTIAL EXPOSURE
CARCINOGENIC AND NONCARCINOGENIC HEALTH EFFECTS FROM DERMAL CONTACT WITH SOILS - ADULT EXPOSURE**

CS	CF	SA	AF	ABS	EF	ED	BW	AT	AT	AVERAGING TIME (NC)	AVERAGING TIME (CA)	NONCARC. DOSE	CANCER DOSE	Dermal REFERENCE DOSE (RfD)	Oral CARC. SLOPE FACTOR (CSF)	HAZARD QUOTIENT	CANCER RISK
SOIL CONC.	CONVERSION FACTOR	SKIN SURFACE AREA (cm ² /event)	SKIN ADHERENCE FACTOR (mg/cm ²)	ABSORPTION FACTOR (1=100%)	EXPOSURE FREQUENCY (events/yr)	EXPOSURE DURATION (yr)	BODY WEIGHT (kg)	(days)	(days)	(days)	(days)	(mg/kg/day)	(mg/kg/day)	(mg/kg/day)	(mg/kg/day)		
Methylene Chloride	20	1E-06	5,000	1.0	0.25	350	70	10,950	25,550	10,950	25,550	3.4E-04	1.47E-04	6.0E-02	7.5E-03	7.13E-03	1.38E-06
Acrylonitrile	1	1E-06	5,000	1.0	0.25	350	70	10,950	25,550	10,950	25,550	1.7E-05	7.34E-06	1.0E-03	5.4E-01	1.80E-02	4.17E-06
Ethylbenzene	400	1E-06	5,000	1.0	0.25	350	70	10,950	25,550	10,950	25,550	6.8E-03	2.94E-03	1.0E-01	8.33E-02		
Styrene	450	1E-06	5,000	1.0	0.25	350	70	10,950	25,550	10,950	25,550	7.7E-03	3.30E-03	2.0E-01	4.28E-02		
																1.51E-01	5.55E-06

DOWN HANGING ROCK PLANT, FORMER DRUM STORAGE AREA - COMMERCIAL/INDUSTRIAL EXPOSURE
CARCINOGENIC AND NONCARCINOGENIC HEALTH EFFECTS FROM DERMAL CONTACT WITH SOILS

CS	CF	SA	AF	ABS	EF	ED	BW	AT	AT	NON-CARC.	CANCER	Dermal	Oral	HAZARD	CANCER
SOIL	CONVERSION	SKIN	SKIN	ABSORPTION	EXPOSURE	EXPOSURE	BODY	AVERAGING	AVERAGING	DOSE	DOSE	REFERENCE	CARC. SLOPE	QUOTIENT	RISK
CONC.	FACTOR	SURFACE	ADHERENCE	FACTOR	FREQUENCY	DURATION	WEIGHT	TIME (MC)	TIME (CA)	DOSE	DOSE	DOSE (RfD)	FACTOR (CSF)		
(mg/kg)		(cm ² /event)	(mg/cm ²)	(1=100%)	(events/yr)	(yr)	(kg)	(days)	(days)	(mg/kg/day)	(mg/kg/day)	(mg/kg/day)	(mg/kg/day)		
Methylene Chloride	50	5,000	1.0	0.25	250	25	70	9,125	25,550	6.1E-04	2.18E-04	6.0E-02	7.5E-03	1.27E-02	2.05E-06
Acrylonitrile	2.5	5,000	1.0	0.25	250	25	70	9,125	25,550	3.1E-05	1.09E-05	1.0E-03	5.4E-01	3.22E-02	6.21E-06
Ethylbenzene	400	5,000	1.0	0.25	250	25	70	9,125	25,550	4.9E-03	1.75E-03	1.0E-01		5.97E-02	
Styrene	1200	5,000	1.8	0.25	250	25	70	9,125	25,550	1.5E-02	5.24E-03	2.0E-01		8.15E-02	
														1.86E-01	8.26E-06

**DOW HANGING ROCK PLANT, FORMER DRUM STORAGE AREA - FUTURE POTENTIAL RESIDENTIAL EXPOSURE
NONCARCINOGENIC HEALTH EFFECTS FROM INHALATION - CHILD EXPOSURE**

SOIL CONC.	INHALATION RATE	VF	PEF	EXPOSURE TIME	EXPOSURE FREQUENCY	EXPOSURE DURATION	BODY WEIGHT	AVERAGING TIME (NC)	NONCARC. DOSE	REFERENCE DOSE (RD)	HAZARD QUOTIENT	
(mg/kg)	(cu.m/hour)	(cu.m/kg)	(cu.m/kg)	(hours/day)	(days/yr)	(yr)	(kg)	(days)	(mg/kg/day)	(mg/kg/day)		
Methylene Chloride	20	0.83	3.35E+03	4.63E+09	24	350	6	15	2,190	7.6E-03	8.60E-01	8.87E-03
Acrylonitrile	1	0.83	1.72E+04	4.63E+09	24	350	6	15	2,190	7.4E-05	5.70E-04	1.31E-01
Ethylbenzene	400	0.83	1.11E+04	4.63E+09	24	350	6	15	2,190	4.6E-02	2.86E-01	1.61E-01
Styrene	450	0.83	2.27E+04	4.63E+09	24	350	6	15	2,190	2.5E-02	2.86E-01	8.86E-02
												3.89E-01

**DOW HANGING ROCK PLANT, FORMER DRUM STORAGE AREA - FUTURE POTENTIAL RESIDENTIAL EXPOSURE
NONCARCINOGENIC HEALTH EFFECTS FROM INHALATION - ADULT EXPOSURE**

SOIL CONC.	INHALATION RATE	VF	PEF	EXPOSURE TIME	EXPOSURE FREQUENCY	EXPOSURE DURATION	BODY WEIGHT	AVERAGING TIME (NC)	NONCARC. DOSE	REFERENCE DOSE (RD)	HAZARD QUOTIENT	
(mg/kg)	(cu.m/hour)	(cu.m/kg)	(cu.m/kg)	(hours/day)	(days/yr)	(yr)	(kg)	(days)	(mg/kg/day)	(mg/kg/day)		
Methylene Chloride	20	0.83	3.35E+03	4.63E+09	24	350	30	70	10,950	1.6E-03	8.60E-01	1.90E-03
Acrylonitrile	1	0.83	1.72E+04	4.63E+09	24	350	30	70	10,950	1.6E-05	5.70E-04	2.80E-02
Ethylbenzene	400	0.83	1.11E+04	4.63E+09	24	350	30	70	10,950	9.9E-03	2.86E-01	3.45E-02
Styrene	450	0.83	2.27E+04	4.63E+09	24	350	30	70	10,950	5.4E-03	2.86E-01	1.90E-02
												8.33E-02

**DOW HANGING ROCK PLANT, FORMER DRUM STORAGE AREA - COMMERCIAL/INDUSTRIAL EXPOSURE
NONCARCINOGENIC HEALTH EFFECTS FROM INHALATION**

	SOIL CONC.	INHALATION RATE	VF	PEF	EXPOSURE TIME	EXPOSURE FREQUENCY	EXPOSURE DURATION	BODY WEIGHT	AVERAGING TIME (NC)	NONCARC. DOSE	REFERENCE DOSE (R _{0D})	HAZARD QUOTIENT
	(mg/kg)	(cu.m/hour)	(cu.m/kg)	(cu.m/kg)	(hours/day)	(days/yr)	(yr)	(kg)	(days)	(mg/kg/day)	(mg/kg/day)	
Methylene Chloride	50	0.83	3.35E+03	4.63E+09	8	250	25	70	9,125	9.7E-04	8.60E-01	1.13E-03
Acrylonitrile	2.5	0.83	1.72E+04	4.63E+09	8	250	25	70	9,125	9.5E-06	5.70E-04	1.66E-02
Ethylbenzene	400	0.83	1.11E+04	4.63E+09	8	250	25	70	9,125	2.3E-03	2.86E-01	8.21E-03
Styrene	1200	0.83	2.27E+04	4.63E+09	8	250	25	70	9,125	3.4E-03	2.86E-01	1.20E-02
												3.80E-02

**DOW HANGING ROCK PLANT, FORMER DRUM STORAGE AREA - FUTURE POTENTIAL RESIDENTIAL EXPOSURE
CARCINOGENIC HEALTH EFFECTS FROM INHALATION - CHILD EXPOSURE**

SOIL CONC.	INHALATION RATE	VF (cu.m/kg)	PEF (cu.m/kg)	EXPOSURE TIME	EXPOSURE FREQUENCY	EXPOSURE DURATION	BODY WEIGHT	AVERAGING TIME (CA)	CANCER DOSE	INHALATION CSF	CANCER RISK
(mg/kg)	(cu.m/hour)	(cu.m/kg)	(cu.m/kg)	(hours/day)	(days/yr)	(yr)	(kg)	(days)	(mg/kg/day)	(mg/kg/day)-1	
Methylene Chloride	20	0.83	3.35E+03	4.63E+09	24	350	15	25,550	6.5E-04	1.60E-03	1.05E-06
Acrylonitrile	1	0.83	1.72E+04	4.63E+09	24	350	15	25,550	6.4E-06	2.40E-01	1.53E-06
2.58E-06											

**DOW HANGING ROCK PLANT, FORMER DRUM STORAGE AREA - FUTURE POTENTIAL RESIDENTIAL EXPOSURE
CARCINOGENIC HEALTH EFFECTS FROM INHALATION - ADULT EXPOSURE**

SOIL CONC.	INHALATION RATE	VF (cu.m/kg)	PEF (cu.m/kg)	EXPOSURE TIME	EXPOSURE FREQUENCY	EXPOSURE DURATION	BODY WEIGHT	AVERAGING TIME (CA)	CANCER DOSE	INHALATION CSF	CANCER RISK
(mg/kg)	(cu.m/hour)	(cu.m/kg)	(cu.m/kg)	(hours/day)	(days/yr)	(yr)	(kg)	(days)	(mg/kg/day)	(mg/kg/day)-1	
Methylene Chloride	20	0.83	3.35E+03	4.63E+09	24	350	70	25,550	7.0E-04	1.60E-03	1.12E-06
Acrylonitrile	1	0.83	1.72E+04	4.63E+09	24	350	70	25,550	6.8E-06	2.40E-01	1.64E-06
2.76E-06											

**DOW HANGING ROCK PLANT, FORMER DRUM STORAGE AREA - COMMERCIAL/INDUSTRIAL EXPOSURE
CARCINOGENIC HEALTH EFFECTS FROM INHALATION**

	SOIL CONC.	INHALATION RATE	VF	PEF	EXPOSURE TIME	EXPOSURE FREQUENCY	EXPOSURE DURATION	BODY WEIGHT	AVERAGING TIME (CA)	CANCER DOSE	INHALATION CSF	CANCER RISK
	(mg/kg)	(cu.m/hour)	(cu.m/kg)	(cu.m/kg)	(hours/day)	(days/yr)	(yr)	(kg)	(days)	(mg/kg/day)	(mg/kg/day)-1	
Methylene Chloride	50	0.83	3.35E+03	4.63E+09	8	250	25	70	25,550	3.5E-04	1.60E-03	5.56E-07
Acrylonitrile	2.5	0.83	1.72E+04	4.63E+09	8	250	25	70	25,550	3.4E-06	2.40E-01	8.13E-07
												1.37E-06

ATTACHMENT B

**EXCERPTS FROM OHIO EPA CLOSURE PLAN REVIEW
GUIDANCE FOR RCRA FACILITIES**

CLOSURE PLAN REVIEW GUIDANCE

for RCRA FACILITIES



INTERIM FINAL

Interim Final
September 1, 1993

00001

INTERIM FINAL

GUIDANCE FOR REVIEWING RISK-BASED CLOSURE PLANS FOR RCRA UNITS

**OHIO ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF HAZARDOUS WASTE MANAGEMENT (DHW)
1800 Watermark Drive, P.O. Box 1049
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**September 1, 1993
Interim Final**

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APPENDIX E

Dose Equations and Standard Default Parameters

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Table 1

RESIDENTIAL EXPOSURE: INGESTION OF CHEMICALS IN SOILS AND DUST

$$\text{Intake (mg/kg-d)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Exposure Parameters	Value	Comments
CS: Chemical Concentration in Soil site-specific (mg/kg)	95% UCL	1
IR: Ingestion Rate (mg/d)		2
child	200	
adult	100	
CF: Conversion Factor (kg/mg)	1×10^{-6}	
FI: Fraction Ingested (unitless)	1	3
EF: Exposure Frequency (days/yr)	350	4
ED: Exposure Duration (yrs)		5
child	6	
adult	30	
BW: Body Weight (kg)		6
child	15	
adult	70	
AT: Averaging Time (days)		7
child noncarcinogens	2,190	
adult noncarcinogens	10,950	
child carcinogens	25,550	
adult carcinogens	25,550	

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Table 2

RESIDENTIAL EXPOSURE: DERMAL CONTACT WITH CHEMICALS IN SOIL

$$\text{Absorbed dose (mg/kg-d)} = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED^*}{BW \times AT}$$

Exposure Parameters	Value	Comments
CS: Chemical Concentration in Soil site-specific (mg/kg)	95% UCL	1
CF: Conversion Factor (kg/mg)	1×10^{-6}	
SA: Skin Surface Area (cm ² /day)		8
child	2,000	
adult	5,000	
AF: Adherence Factor (unitless)	1.0	9
ABS: Absorption Factor (unitless)		10
EF: Exposure Frequency (days/yr)	350	4
ED: Exposure Duration (yrs)		5
child	6	
adult	30	
BW: Body Weight (kg)		6
child	15	
adult	70	
AT: Averaging Time (days)		7
child noncarcinogens	2,190	
adult noncarcinogens	10,950	
child carcinogens	25,550	
adult carcinogens	25,550	

* Refer to Comment 11

Table 5

INTERIM FINAL**RESIDENTIAL EXPOSURE: INHALATION OF AIRBORNE CHEMICALS**

$$\text{Intake (mg/kg-d)} = \frac{\text{CA} \times \text{IR} \times \text{ET} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT}}$$

Exposure Parameters	Value	Comments
CA: Chemical Concentration in Air site-specific (mg/m ³)	modelled	1
IR: Inhalation Rate child/adult, outdoor (m ³ /hr)	0.83	14
showering	0.6	
ET: Exposure Time (hrs/day)		15
child/adult, outdoor	24	
showering	0.2	
EF: Exposure Frequency (days/yr)	350	4
ED: Exposure Duration (yrs)		5
child	6	
adult	30	
BW: Body Weight (kg)		6
child	15	
adult	70	
AT: Averaging Time (days)		7
child noncarcinogens	2,190	
adult noncarcinogens	10,950	
child carcinogens	25,550	
adult carcinogens	25,550	

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Table 6

INDUSTRIAL EXPOSURE: INGESTION OF CHEMICALS IN SOILS AND DUST

$$\text{Intake (mg/kg-d)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Exposure Parameters	Value	Comments
CS: Chemical Concentration in Soil site-specific (mg/kg)	95% UCL	1
IR: Ingestion Rate (mg/d)	50	2
CF: Conversion Factor (kg/mg)	1×10^{-6}	
FI: Fraction Ingested (unitless)	1	3
EF: Exposure Frequency (days/yr)	250	4
ED: Exposure Duration (yrs)	25	5
BW: Body Weight (kg)	70	6
AT: Averaging Time (days)		7
adult noncarcinogens	9,125	
adult carcinogens	25,550	

Table 7

INDUSTRIAL EXPOSURE: DERMAL CONTACT WITH CHEMICALS IN SOIL

$$\text{Absorbed dose (mg/kg-d)} = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED^*}{BW \times AT}$$

Exposure Parameters	Value	Comments
CS: Chemical Concentration in Soil site-specific (mg/kg)	95% UCL	1
CF: Conversion Factor (kg/mg)	1×10^{-6}	
SA: Skin Surface Area (cm ² /day)	5,000	8
AF: Adherence Factor (unitless)	1.0	9
ABS: Absorption Factor (unitless)		10
EF: Exposure Frequency (days/yr)	250	4
ED: Exposure Duration (yrs)	25	5
BW: Body Weight (kg)	70	6
AT: Averaging Time (days)		7
adult noncarcinogens	9,125	
adult carcinogens	25,550	

* Refer to Comment 11

Table 10

INDUSTRIAL EXPOSURE: INHALATION OF AIRBORNE CHEMICALS

$$\text{Intake (mg/kg-d)} = \frac{\text{CA} \times \text{IR} \times \text{ET} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT}}$$

Exposure Parameters	Value	Comments
CA: Chemical Concentration in Air site-specific (mg/m ³)	modelled	1
IR: Inhalation Rate adult, outdoor (m ³ /hr) showering	0.83 0.6	14
ET: Exposure Time (hrs/day) adult, outdoor showering	8 0.2	15
EF: Exposure Frequency (days/yr)	250	4
ED: Exposure Duration (yrs)	25	
BW: Body Weight (kg)	70	6
AT: Averaging Time (days) adult noncarcinogens adult carcinogens	9,125 25,550	7

Comments for Tables 1 through 5

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1. Site-specific values should be used from the contaminated site. The 95% UCL shall be used to quantify the exposure from soil, air, and water. In some cases, on-site air concentrations may have to be calculated using dispersion models. Refer to Section 3.2.4.
2. The ingestion rate suggested for children, ages 1 through 6 (6 years of exposure), are based primarily on fecal tracer studies which account for ingestion of indoor dust as well as outdoor soil. These values should be viewed as long-term average daily ingestion rates for children and should be used in conjunction with an exposure frequency of 365 days per year as per RAGS, Part A (USEPA, 1989). Subsequently, the March 21, 1991 Standard Default Exposure Factors updated the exposure frequency to 350 days per year.
3. Note that household dust, which contributes significantly to daily soil ingestion may have contaminant concentrations equal to 100% (RAGS, Part A; USEPA, 1989) of outdoor soil. In these cases, indoor dust is assumed to be equal to outdoor soil, fraction of soil or dust ingested from the site is equal to 1.0.
4. Human behavior patterns can strongly affect exposure results. Based on the limitations of our knowledge, the values for the exposure duration and frequency for the pathways considered are intended to be best reasonable upper-bound estimates. For example, the vapor inhalation scenario assumes that a person will be breathing at a rate of 20 m³ per day for 24 hours per day for a period of 30 years. It also assumes that the concentration indoors will be the same as the concentration outdoors. These assumptions are considered reasonable since it is possible to observe certain subpopulations (i.e., housewives spending the majority of their time at their residence).
5. Refer to RAGS, Part A (USEPA, 1989a) for a more detailed discussion.
6. Body weight for adults and children are assumed to be average values of males and females (RAGS, Part A; USEPA, 1989a).
7. Refer to RAGS, Part A (USEPA, 1989a) for a more detailed discussion.
8. For dermal contact with soil and dust, twenty five percent of the total skin area may be exposed to soil. Thus, applying 25% of the total surface area results in defaults of 2,000 cm² and for children and 5,000 cm² for adults. When calculating exposure while showering, bathing or

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swimming in contaminated water the average values of total body surface area is assumed to be exposed. Refer to *Dermal Exposure Assessment: Principles and Applications* (USEPA, 1992a).

9. Adherence factor are assumed to be 1.0 mg/cm^2 unless site-specific information shows that this rate is inaccurate.
10. For the purposes of dermal exposure to contaminated soil, absorption factors of 25% for volatile organic chemicals (VOCs), 10% for semivolatile organic compounds (SVOCs), and 1% for inorganic compounds (Ryan et al., 1987). These default values should be modified when chemical-specific information is available.
11. In assessing dermal contact risks, it is necessary to convert oral SFs oral RfDs from administered doses to absorbed doses since the exposure assessment is expressed as an absorbed dose. Chemical-specific information regarding oral absorption should be used if possible. Appendix G contains oral absorption factors which should be used as follows: (1) use human absorption factors before animal absorption factors; (2) use the most conservative absorption factor (e.g., highest percentage); and (3) use animal absorption factors when human absorption factors are unavailable. When oral factors are not listed in Appendix G, search the open literature.
12. The value of liters per day is based mostly on tradition. Use of the traditional values is necessitated by the fact that many EPA risk assessment "standards" were based on those intakes. It is also comparable to the eight glasses of water per day historically recommended by health authorities, and USEPA uses 2 liters per day when calculating drinking water standards.
13. Chemical-specific values for permeability constants should be sought in referred journals and other suitable technical publications. When pursuing values found in the literature, always include a complete citation. Refer to *Dermal Exposure Assessment: Principles and Applications* (USEPA, 1992a).
14. Currently, inhalation SFs and RfCs are derived by USEPA using the traditional inhalation rate of 20 m^3 per day, thus this value should be used for both adults and children.
15. This pathway assumes that the individual is exposed to contaminants in the air from outdoor soil, household dust, and suspended particulate matter inside and outside the house. Thus, residents who are assumed to live on the contaminated site may come into contact daily with contaminated soil outdoors or with contaminated dust inside

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their house. Even during the rainy season or winter season where low temperatures, snow, and frozen or saturated ground limit outdoor play and consequent exposure to soil, indoor exposure is assumed to occur during this period. Therefore, household dust can contribute significantly to daily soil ingestion and may have contaminant concentrations equal to 100% (RAGS, Part A; USEPA, 1989a) of outdoor soil. Therefore, it is assumed exposure occurs 24 hours per day even though "outdoor" time is only a fraction of the day, and indoor contaminant concentrations are in equilibrium with those outdoors.

ATTACHMENT C

EXCERPTS FROM U.S. EPA RISK ASSESSMENT GUIDANCE FOR SUPERFUND - PART B (RAGS-B)

Publication 6228.7-01B
December 1991

PB92-963333

**Risk Assessment Guidance
for Superfund:
Volume I —
Human Health Evaluation Manual
(Part B, Development of
Risk-based Preliminary
Remediation Goals)**

Interim

**Office of Emergency and Remedial Response
U.S. Environmental Protection Agency
Washington, DC 20460**

**REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL
INFORMATION SERVICE
SPRINGFIELD, VA 22161**

COMMERCIAL/INDUSTRIAL SOIL - CARCINOGENIC EFFECTS

$$TR = \frac{SF_o \times C \times 10^{-6} \text{ kg/mg} \times EF \times ED \times IR_{\text{ing}}}{BW \times AT \times 365 \text{ days/yr}} + \frac{SF_i \times C \times EF \times ED \times IR_{\text{inh}} \times (1/VF + 1/PEF)}{BW \times AT \times 365 \text{ days/yr}}$$

$$C \text{ (mg/kg; risk-based)} = \frac{TR \times BW \times AT \times 365 \text{ days/yr}}{EF \times ED \times [(SF_o \times 10^{-6} \text{ kg/mg} \times IR_{\text{ing}}) + (SF_i \times IR_{\text{inh}} \times (1/VF + 1/PEF))]} \quad (6)$$

where:

Parameters	Definition (units)	Default Value
C	chemical concentration in soil (mg/kg)	—
TR	target excess individual lifetime cancer risk (unitless)	10 ⁻⁶
SF _i	inhalation cancer slope factor ((mg/kg-day) ⁻¹)	chemical-specific
SF _o	oral cancer slope factor ((mg/kg-day) ⁻¹)	chemical-specific
BW	adult body weight (kg)	70 kg
AT	averaging time (yr)	70 yr
EF	exposure frequency (days/yr)	250 days/yr
ED	exposure duration (yr)	25 yr
IR _{ing}	soil ingestion rate (mg/day)	50 mg/day
IR _{inh}	workday inhalation rate (m ³ /day)	20 m ³ /day
VF	soil-to-air volatilization factor (m ³ /kg)	chemical-specific (see Section 3.3.1)
PEF	particulate emission factor (m ³ /kg)	4.63 x 10 ⁹ m ³ /kg (see Section 3.3.2)

$$C_{\text{sat}} = (K_d \times s \times n_m) + (s \times \theta_m) \quad (6a)$$

where:

Parameters	Definition (units)	Default Value
C _{sat}	soil saturation concentration (mg/kg)	—
K _d	soil-water partition coefficient (L/kg)	chemical-specific, or K _{ow} x OC
K _{oc}	organic carbon partition coefficient (L/kg)	chemical-specific
OC	organic carbon content of soil (fraction)	site-specific, or 0.02
s	solubility (mg/L-water)	chemical-specific
n _m	soil moisture content, expressed as a weight fraction	site-specific
θ _m	soil moisture content, expressed as L-water/kg-soil	site-specific

REDUCED EQUATION: COMMERCIAL/INDUSTRIAL SOIL - CARCINOGENIC EFFECTS

$$\text{Risk-based PRG} = \frac{2.9 \times 10^{-4}}{[(5 \times 10^{-5}) \times SF_o] + (SF_i \times ((20/VF) + (4.3 \times 10^{-9})))} \quad (6')$$

where:

SF _o	= oral slope factor in (mg/kg-day) ⁻¹
SF _i	= inhalation slope factor in (mg/kg-day) ⁻¹
VF	= chemical-specific soil-to-air volatilization factor in m ³ /kg (see Section 3.3.1)

If PRG > C_{sat}, then set PRG = C_{sat} (where C_{sat} = soil saturation concentration (mg/kg); see Equation (6a) and Section 3.3.1).

COMMERCIAL/INDUSTRIAL SOIL — NONCARCINOGENIC EFFECTS

$$THI = \frac{C \times 10^{-6} \text{ kg/mg} \times EF \times ED \times IR_{\text{soil}}}{RfD_o \times BW \times AT \times 365 \text{ days/yr}} + \frac{C \times EF \times ED \times IR_{\text{air}} \times (1/VF + 1/PEF)}{RfD_i \times BW \times AT \times 365 \text{ days/yr}}$$

$$C \text{ (mg/kg, risk-based)} = \frac{THI \times BW \times AT \times 365 \text{ days/yr}}{ED \times EF \times [((1/RfD_o) \times 10^{-6} \text{ kg/mg} \times IR_{\text{soil}}) + ((1/RfD_i) \times IR_{\text{air}} \times (1/VF + 1/PEF))]} \quad (7)$$

where:

Parameters	Definition (units)	Default Value
C	chemical concentration in soil (mg/kg)	—
THI	target hazard index (unitless)	1
RfD _o	oral chronic reference dose (mg/kg-day)	chemical-specific
RfD _i	inhalation chronic reference dose (mg/kg-day)	chemical-specific
BW	adult body weight (kg)	70 kg
AT	averaging time (yr)	25 yr (always equal to ED)
EF	exposure frequency (days/yr)	250 days/yr
ED	exposure duration (yr)	25 yr
IR _{soil}	soil ingestion rate (mg/day)	50 mg/day
IR _{air}	workday inhalation rate (m ³ /day)	20 m ³ /day
VF	soil-to-air volatilization factor (m ³ /kg)	chemical-specific (see Section 3.3.1)
PEF	particulate emission factor (m ³ /kg)	4.63 x 10 ⁹ m ³ /kg (see Section 3.3.2)

$$C_{\text{sat}} = (K_d \times s \times n_m) + (s \times \theta_m) \quad (7a)$$

where:

Parameters	Definition (units)	Default Value
C _{sat}	soil saturation concentration (mg/kg)	—
K _d	soil-water partition coefficient (L/kg)	chemical-specific, or K _{ow} x OC
K _{oc}	organic carbon partition coefficient (L/kg)	chemical-specific
OC	organic carbon content of soil (fraction)	site-specific, or 0.02
s	solubility (mg/L-water)	chemical-specific
n _m	soil moisture content, expressed as a weight fraction	site-specific
θ _m	soil moisture content, expressed as L-water/kg-soil	site-specific

REDUCED EQUATION: COMMERCIAL/INDUSTRIAL SOIL — NONCARCINOGENIC EFFECTS

$$\text{Risk-based PRG (mg/kg, THI = 1)} = \frac{102}{[(5 \times 10^{-3}/RfD_o) + ((1/RfD_i) \times ((20/VF) + (4.3 \times 10^9)))]} \quad (7')$$

where:

RfD _o	= oral chronic reference dose in mg/kg-day
RfD _i	= inhalation chronic reference dose in mg/kg-day
VF	= chemical-specific soil-to-air volatilization factor in m ³ /kg (see Section 3.3.1)

If PRG > C_{sat}, then set PRG = C_{sat} (where C_{sat} = soil saturation concentration (mg/kg); see Equation (7a) and Section 3.3.1).

A chemical-specific value for VF is used in the standard default equations (Equations (6), (6'), (7), and (7') in Section 3.2.2) and is developed in Equation (8). The VF value calculated using Equation (8) has been developed for specific use in the other equations in this guidance; it may not be applicable in other technical contexts. Equation (8) lists the standard default parameters for calculating VF. If site-specific information is available, Equation (8) may be modified to calculate a VF that is more appropriate for the particular site. Supporting references should be consulted when substituting site-specific data to ensure that the model and specific parameters can be appropriately applied to the given site.

3.3.2 PARTICULATE EMISSION FACTOR

The particulate emission factor (PEF) relates the contaminant concentration in soil with the concentration of respirable particles (PM₁₀) in the air due to fugitive dust emissions from surface contamination sites. This relationship is derived by Cowherd (1985) for a rapid assessment procedure applicable to a typical hazardous waste site where the surface contamination provides a relatively continuous and constant potential for emission over an extended period of time (e.g., years). The particulate emissions from contaminated sites are due to wind erosion and, therefore, depend on the erodibility of the surface.

SOIL-TO-AIR VOLATILIZATION FACTOR

$$VF (m^3/kg) = \frac{(LS \times V \times DH)}{A} \times \frac{(3.14 \times \alpha \times T)^{1/2}}{(2 \times D_e \times E \times K_{ow} \times 10^{-3} \text{ kg/g})} \quad (8)$$

where:

$$\alpha (cm^2/s) = \frac{(D_e \times E)}{E + (p_s)(1-E)/K_{ow}}$$

Standard default parameter values that can be used to reduce Equation (8) are listed below. These represent "typical" values as identified in a number of sources. For example, when site-specific values are not available, the length of a side of the contaminated area (LS) is assumed to be 45 m; this is based on a contaminated area of 0.5 acre which approximates the size of an average residential lot. The "typical" values LS, DH, and V are from EPA 1986. "Typical" values for E, OC, and p_s are from EPA 1984, EPA 1988b, and EPA 1988f. Site-specific data should be substituted for the default values listed below wherever possible. Standard values for chemical-specific D_e , H, and K_{ow} can be obtained by calling the Superfund Health Risk Technical Support Center.

Parameter	Definition (units)	Default
VF	volatilization factor (m ³ /kg)	—
LS	length of side of contaminated area (m)	45 m
V	wind speed in mixing zone (m/s)	2.25 m/s
DH	diffusion height (m)	2 m
A	area of contamination (cm ²)	20,250,000 cm ²
D_e	effective diffusivity (cm ² /s)	$D_i \times E^{0.33}$
E	true soil porosity (unitless)	0.35
K_{ow}	soil/air partition coefficient (g soil/cm ³ air)	$(H/K_d) \times 41$, where 41 is a units conversion factor
p_s	true soil density or particulate density (g/cm ³)	2.65 g/cm ³
T	exposure interval (s)	7.9×10^8 s
D_i	molecular diffusivity (cm ² /s)	chemical-specific
H	Henry's law constant (atm-m ³ /mol)	chemical-specific
K_d	soil-water partition coefficient (cm ³ /g)	chemical-specific, or $K_{ow} \times OC$
K_{oc}	organic carbon partition coefficient (cm ³ /g)	chemical-specific
OC	organic carbon content of soil (fraction)	site-specific, or 0.02

ATTACHMENT D

CALCULATION OF VOLATILIZATION FACTORS (VFS)

**Calculation of Volatilization Factor (VF)
Risk Assessment Guidance for Superfund, Volume 1, Part B
Former Drum Storage Area, Dow Hanging Rock Plant**

	LS (length of side - meter)	V (wind speed m/sec)	DH (diffusion height -m)	Area (sq. cm.)	pi (3.1416)
Methylene Chloride	22.4	2.25	2	5,000,000	3.1416
Ethylbenzene	22.4	2.25	2	5,000,000	3.1416
Styrene	22.4	2.25	2	5,000,000	3.1416
Acrylonitrile	22.4	2.25	2	5,000,000	3.1416

Di (diffusivity in air - sq.c	Koc (mL/g)	OC (organic carbon fraction in soil)	Kd (mL/g) Kd = Koc x OC	E (soil porosity)	Dei (effective diffusivity - sq. cm/sec) Dei = Di x E^(0.33) (sq. cm/sec)
0.101	8.80	0.02	0.18	0.35	0.0714
0.075	220.00	0.02	4.40	0.35	0.0530
0.071	360.00	0.02	7.20	0.35	0.0502
0.11	10.00	0.02	0.20	0.35	0.0778

P (soil density - g/cu. cm)	H (Henry - atm-cu. m./mole)	Kas (g soil/cu. cm air) Kas = (H/Kd) x 41 (g/cu. cm)	T (exposure Interval - sec)	alpha (sq. cm/sec) alpha = (Dei x EYE + P(1-EY)Kas	I
2.65	2.03E-03	4.73E-01	7.88E+08	6.26E-03	
2.65	6.43E-03	5.99E-02	7.88E+08	6.38E-04	
2.65	2.81E-03	1.60E-02	7.88E+08	1.63E-04	
2.65	8.80E-05	1.80E-02	7.88E+08	2.84E-04	

C.F. (kg/g)	VF (cu. m/kg) Calc. 1 x Calc. 4
0.001	3.35E+03
0.001	1.14E+04
0.001	2.27E+04
0.001	1.72E+04

APPENDIX E

EXAMPLE OF FORM TO BE USED DURING CLOSURE ACTIVITIES

FORM 1
DAILY FIELD LOG

Date: ____ / ____ / ____	Arrive Onsite: _____	Depart Site: _____
--------------------------	----------------------	--------------------

Depart Site: _____

Weather Conditions

Morning: _____

Afternoon: _____

Afternoon: _____

AWD Field Personnel Present: _____

Other Personnel: _____

Other Personnel: _____

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

Signature: _____

OFFSITE WASTE SHIPMENT LOG

Page _____ of _____

[illegible]

FORM 3**HEADSPACE ANALYSIS SAMPLE LOG**

Date: _____ Project Name/Number: _____

Operator: _____ Location: _____

Background Concentration: _____

Sample Number	Locations Composited	Estimated Headspace Concentration (ppm)

Notes:

FORM 4**SAMPLING LOG**

Date: _____ Project Name/Number: _____

Operator: _____ Location: _____

Sample Number	Location(s)	Indicate Purpose for Sample	
		Clean Confirmation	Land Disposal Restrictions

Notes:



CHAIN-OF-CUSTODY RECORD

[illegible]

